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AUTOMOTIVE INDUSTRIES

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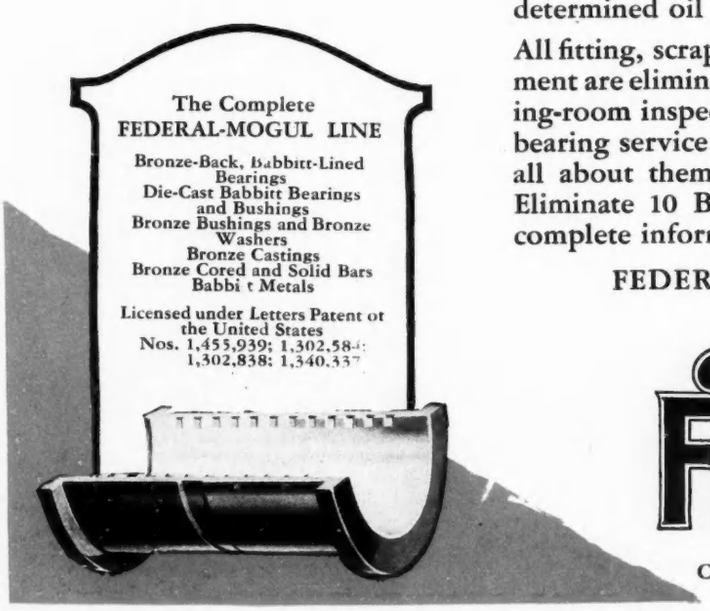

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AUTOMOTIVE INDUSTRIES

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Favorable Prospect for 1930 Seen In Analysis of *Economic Factors*

Government and corporate programs for next year as outlined at National Business Conferences will aid the automobile industry. Outlook for nearly 5,000,000 units next year.

By EARL O. EWAN

INDUCED to take measure of the tangible influences affecting their industry by the practical leadership of President Hoover, automobile manufacturers of the United States have found in economic factors outside the stock market concrete reasons for encouragement and even optimism.

Their conclusions naturally have not been based upon mere hopeful prognostications. They have not set the production and sale of around 5,000,000 units as their 1930 goal upon the basis of a wish. Nor did they arrange for their plants to begin this month the turning out of 1930 models, as they are doing, as a result of ethereal theorization. Instead, they analyzed economic developments of 1929, and particularly those of the last two months, and calculated the effects they will have on the automobile industry in 1930.

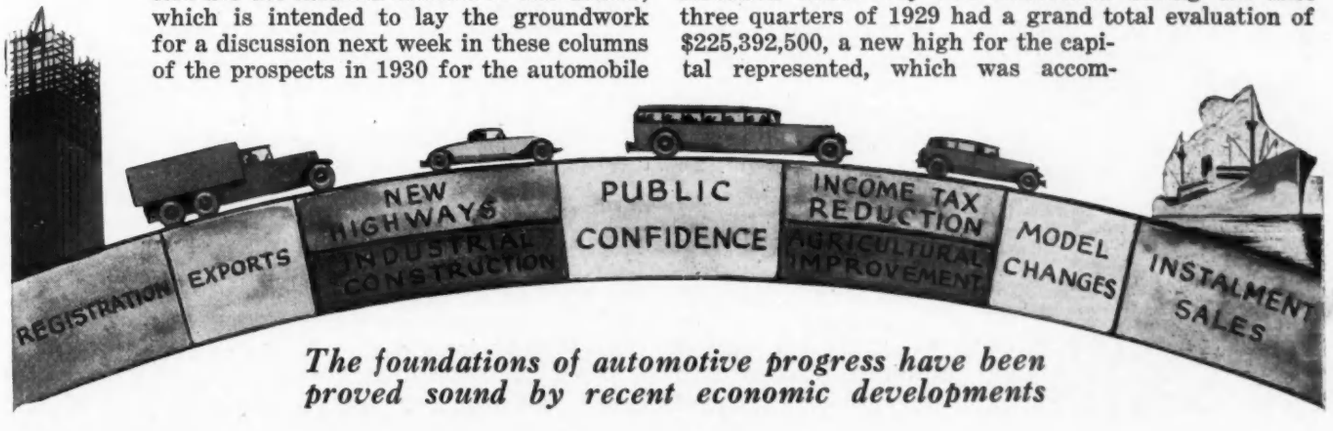
It was by this procedure that an estimate of between 2,500,000 and 3,000,000 cars as the replacement market in 1930 was reached, an influential element in the figuring being the fact that the 1923 output will be coming up next year to be superseded. Likewise, it was approximated that the export market next year will take more than the 1,000,000 vehicles required this year to meet its demand. In making these determinations, such fundamentals were kept in mind as the fact that the industry in 1929 has set a record not only in production but also in sales. Such fundamentals and economic factors are the cardinal concern of this article, which is intended to lay the groundwork for a discussion next week in these columns of the prospects in 1930 for the automobile industry with forecasts as to production and sales.

Announcement last week by the National Automobile Chamber of Commerce that the estimated motor car output for November was 214,400 units for the United States and Canada brought the total for the 11 months of 1929 to 5,480,000 as compared with 4,601,000 for all of 1928. The aggregate turnout for this year has been approximated at 5,600,000.

As for sales, figures for passenger cars indicate that the total of new registrations for 1929 will be about 4,000,000 as against 3,220,000 for all of 1928. Sales for the first nine months of 1929 were 32 per cent greater than those in the same period of 1928, but the ratio has decreased as the year progressed, as was especially noticeable in September and October. The September increase, for example, was only 12 per cent. October sales totaled around 260,000 units, while November sales have been estimated at about 200,000.

Even in the aftermath of the stock market declines there appeared a cause for satisfaction in motordom. Automobile stocks mounted in value almost 40 per cent faster than industrials in the rebound that followed the low levels of Nov. 9, 11 and 13 as a result of purchases by bargain hunters who bought not on the basis of statistical information but of confidence in the automobile business.

It also was learned that automotive and allied construction under way and announced during the first three quarters of 1929 had a grand total evaluation of $225,392,500, a new high for the capital represented, which was accom-



The foundations of automotive progress have been proved sound by recent economic developments

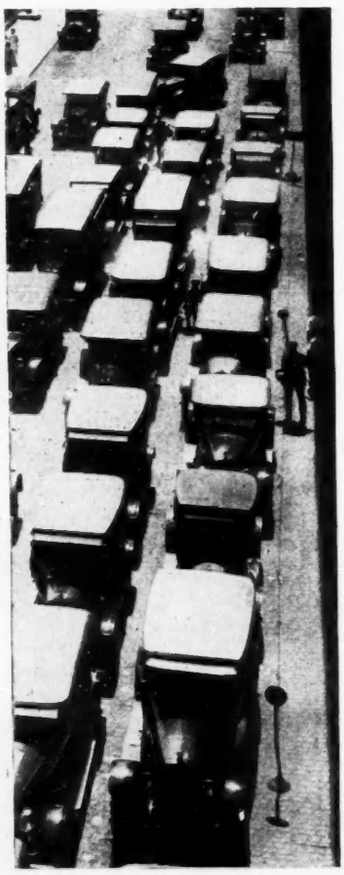
panied by a record number of projects. Automobile, tire, parts and accessory manufacturers have expended on buildings, or have announced building programs, totaling $79,000,000 thus far this year. Revamping of present plants and the installation of new machinery probably will add $8,000,000 to this figure before next January.

Twenty-three per cent is represented by automobile plant construction of the total building under way or announced under the general heading of automotive. Service stations and garages under way and projected reached $108,527,000 during the first nine months of this year. Airplane plants and airport construction, including reconditioning and repair shops, totaled 159 projects, costing $38,247,600, a new high for the number of buildings, but a decline of about 5 per cent in value.

Income Tax Reduction Will Aid

One of the two steps that have been taken by the Government to reestablish confidence should give quick and tangible assistance to the automobile manufacturers as corporations. That is the assurance that there will be a reduction in income taxes estimated at $160,000,000. It is to take the form of a lowering of 1 per cent on corporation taxes and normal taxes on individual incomes. This will have at least three effects. The first will be the direct relief from the heavy burden of taxation. The second will be the psychological one arising from the implied confidence of the Government in the continuance of individual and corporate incomes at a high level, and the third will be to make available at the opening of 1930 additional funds for the profit or earnings ledgers, or to be applied for plant improvements or extensions, or to the manufacturing processes generally.

The other step taken, the holding of conferences by the President with members of his Cabinet and representatives of industry, agriculture and labor, may indirectly be even more helpful to the industry than the first. These conferences concern directly at least a third of the nation's population that is engaged in pursuits listed under one of those headings, judging from the 1920 census figures. The population of the country then was placed at 105,000,000, while today it is estimated at 120,000,000.



The announcement at certain of these conferences of plans for expending $1,810,000,000 in 1930 by utilities for new construction, expansion of facilities and maintenance of existing properties, of $1,000,000,000 by railroads of the country in the coming year on capital improvement projects, besides the outlay of millions of dollars next year by the states for highway and building construction and improvement, and the launching of a $423,000,000 public buildings program by the Treasury Department, cannot but entail the purchase and use next year of hundreds of additional motor vehicles.

Moreover, the work provided by these projects will mean wages for men who will need transportation in the form of automobiles, in many instances to go to and from work more conveniently. In addition, any growth of the highway mileage will increase the demand for automobiles and further remove fears of market saturation due to traffic congestion.

Without a doubt, the most widely heralded action that has been taken in the automobile industry as a result of the President's conferences was that of the Ford Motor Co. in increasing the wages of its employees in the United States and Canada. The increase in the United States will aggregate $19,500,000 annually and will affect more than 140,000 employees throughout the country, it was announced last week by Edsel B. Ford, president of the Ford Motor Co. The wage increases of the Ford Motor Co. of Canada will amount to $1,000,000 yearly and affect 7000 employees, it was made known by Wallace R. Campbell, president. The wage increases were effective Dec. 2, which was but a short time after wage rises had been given employees of the Ford Motor Co. in its Mexico City plant. In the United States and Canada the increases mean that the minimum wage at the Ford plants has been raised from $6 to $7 a day, with graduated increases for all employees who are at present receiving in excess of the minimum. The increases amount to about five cents an hour to higher-salaried employees, the lower salaried men being the chief beneficiaries.

No general wage increase in the automobile industry is expected to result from the raises granted by Ford, however, and it is not expected that any unfavorable labor situation will arise from it, since the industry as a whole has for a number of years been a leader in the paying of relatively high wages. Employment in Detroit and other automotive centers has risen this month due to the production of new models. As there are 52,000 dealers in the country, it will require approximately 250,000 cars to care for showroom models, it was stated last week by Alvan Macauley, president of the Packard Motor Car Co. and the National Automobile Chamber of Commerce.

Tariff Delay Has No Effect

Little, if any, uncertainty in the automobile industry can be attributed to the deferred action on the tariff bill framed and considered by the first session of the Seventy-first Congress, which adjourned on Nov. 22. The long session of the Seventy-first Congress, which assembled on Dec. 2, is expected to see definite action on the bill. When the bill is enacted it doubtless will contain the duty provisions relative to automobiles that were recommended last July by leaders in the industry. Their recommendation was for a reduction in the ad valorem duty on passenger cars from 25 to 10 per cent with the retention of the countervailing clause, and the maintenance of the 25 per cent ad valorem duty with the countervailing clause on motor trucks. The automobile industry naturally will watch with interest the placing of duties upon certain products which it uses. Definite disposition of the schedules has not been accomplished, however, since the tariff bill remained as the unfinished business of the Senate on its adjournment on Nov. 22.

The continuance of money rates to decline has been

a factor favorable to plans for plant expansions, the installation of new equipment and instalment purchases. Call money at the end of November was down to 4½ per cent, as contrasted with 6 per cent at the end of October and 20 per cent at the recent peak. Sixty-to-ninety-day time money was down to 4¾ per cent, as against 6 per cent at the end of October and 9½ per cent at the peak. Commercial paper was down to 5 per cent, as compared with 6 per cent at the end of October and 6¼ per cent at the top, and 90-day bankers' acceptances had declined to 3⅞ per cent, as compared with 4⅝ per cent at the end of October and 5⅝ per cent at the peak.

Model Changes Help Tool Makers

The introduction of numerous new models next year, which already is scheduled, naturally will involve changes in plant equipment, the extent of which may not be known until they are ready to be turned out in volume, which probably will be not later than next March in most instances. Certain of the models, of course, will go into quantity production sooner. While routine replacements may be postponed for brief periods in certain instances, that procedure cannot be followed for long, it is believed, because of competitive forces that make it necessary for plants to be kept at their highest possible peak of efficiency. Therefore, machine tool and plant equipment builders should not settle down with the expectation of passing a prolonged period in the doldrums. Many of the automobile plants have been strained to capacity in the year that is closing, and they will have to be rehabilitated before production in large volume proceeds.

Instalment selling should assist in the present situation by enabling those who were hit by the stock market to buy on instalments instead of paying cash, it has been pointed out. No noticeable increase in defaults, repossessions and delinquencies has developed since Nov. 1. The importance of instalment selling may be increased if the National Association of Finance Companies is successful in its efforts to have finance company paper made eligible for rediscount at Federal Reserve Banks.

Indicative of the feeling that the Middle Western farmers are prospering and that their buying power is such that it will be felt by industry throughout the country in 1930 are the remarks of President Hoover under the heading "Agriculture" in his first annual message to Congress, delivered last week. The President said in part:

Improved Farm Income a Factor

"The agricultural situation is improving. The gross farm income as estimated by the Department of Agriculture for the crop season 1926-27 was $12,100,000,000, for 1927-28 it was $12,300,000,000, for 1928-29 it was $12,500,000,000, and, estimated on the basis of prices since the last harvest, the value of the 1929-30 crop would be over $12,650,000,000. The slight decline in general commodity prices during the past few years naturally assists the farmers' buying power.

"The number of farmer bankruptcies is very materially decreased below previous years. The decline in land values now seems to be arrested and rate of movement from the farm to the city has been reduced. Not all sections of agriculture, of course, have fared equally, and some areas have suffered from drought. Responsible farm leaders have assured me that a large measure of confidence is returning to agriculture, and that a feeling of optimism pervades that industry.

"The most extensive action for strengthening the agricultural industry ever taken by any government was inaugurated through the farm marketing act of June 15 last. Under its provisions the Federal Farm Board has been established, comprised of men long and widely experienced in agriculture and sponsored by the farm organizations of the country. During its short period of existence the board has taken definite steps toward a more efficient organization of agriculture, toward the elimination of waste in marketing and toward the upbuilding of farmers' marketing organizations on sounder and more efficient lines. . . ."

It is interesting to note in this connection that on the subject of "Highways," the President said in part:

". . . Federal aid in the construction of the highway systems in conjunction with the states has proved to be beneficial and stimulating. We must ultimately give consideration to the increase of our contribution to these systems, particularly with a view to stimulating the improvement of farm-to-market roads."

Despite the business conferences and optimistic statements that have been published, however, probably the most commonly expressed conviction among business men of all trades and professions about the business situation seems to have been rather well summed up last week in a paragraph written by that specialist in the interpretation of general opinion and conversation, Arthur Brisbane. It read:

Correct Mental Attitude Important

"Prosperity for the next few months depends on the mental attitude of the people and their private talking. No President, no collection of hundred-million-dollar men, no promises to spend billions, can wipe out the bad effects of a national pessimistic mood."

If we look for a more tangible evidence of the business status of the country, we must investigate the retail barometer, which shows actual consumption. The survey of the United Business Publishers, Inc., gives the business outlook as the result of a nation-wide investigation among the 400,000 retailers, wholesalers and manufacturers who subscribe to its 34 publications covering practically every important merchandising industry. The report of the survey says that motor truck sales in October, 1929, were 15 per cent ahead of October, 1928, and continues:

"Actual facts regarding sales, collections, retail stocks and similar items were gathered from thousands of retailers during the latter part of November. Obviously, these data cannot tell the entire and final story of the reaction upon trade of the stock market drop, but they do provide a firm

(Continued on page 863)

Shop Practice and Management at Fiftieth Annual Meeting

New light on quality control and Earle Buckingham of M.I.T. direct-labor workers, in

SIGNALIZED by the attendance of more than 2000 engineers, research executives and representatives of the leading engineering colleges in the country, the Fiftieth Annual Meeting of the American Society of Mechanical Engineers was brought to a close last week. Simultaneous sessions were held on a variety of interesting developments, chief of which were in the field of machine shop practice, production management, aeronautics and applied mechanics. Much interest was aroused by the presentation of some valuable material relating to the determination of economic quantities in lot production. Detailed and scientific study of formulae used in the determination of these lots is progressing at the economics department of the Massachusetts Institute of Technology, under the auspices of the Management Division of the A.S.M.E. Considerable light was thrown on the cutting fluid situation. Striking inconsistencies in their use and selection are pointed out, and definite research into that phase of the problem is recommended.

A number of the papers are reviewed herewith. Several of these will be covered more in detail in subsequent issues.

H. J. French, International Nickel Co. (left), and T. G. Digges, associate metallurgist, U. S. Bureau of Standards (right), who were co-authors of a paper on turning with shallow cuts at high speeds, at the 50th Annual Meeting of the A.S.M.E. in New York last week

The Eighth Annual Power Show, featuring 424 exhibits, was the center of attraction for the engineers attending the meeting. As is usual, the major part of the exhibits dealt with powerplant equipment and accessories. This year, however, a number of exhibits were of particular interest to automotive production men. Among these were some new developments in cemented tungsten-carbide, inspection and laboratory equipment and portable tools.

An interesting variation in the program was a series of daily inspection trips to several of the larger buildings, where power equipment of recent design and construction was studied by the visitors.

"Quality Control and Production Gages," a critical study of inspection and its relationship to manufacturing tolerances and gaging, was presented before the Machine Shop Practice Division by Earle Buckingham, associate professor, Engineering Standards and Management, Massachusetts Institute of Technology.

The author sheds an interesting sidelight on inspection in the following quotation from E. D. Hall:

"Inspection in general does not create, but rather controls, quality. Quality is conceived in the design and given substance in the materials chosen, and takes form in the manufacturing operations. Given good designs and materials, the manufacturing organization must be held responsible for the construction of a satisfactory commodity. However, the executives of this branch have many opposing forces bringing pressure upon them, such as demands for quick delivery, low costs, high earnings for the operators, and quality. Since the first three are immediate and ever-present, while the consequences of variations in quality are usually more remote, it follows that the first three will receive the most attention by the branch engaged in producing, and that the supervision and control of quality, because of its importance, can best be cared for in a separate organization."

The professor then shows that inspection falls logically into two divisions. The first is the shop inspection, which is concerned with the control of set-up and work in process. The second division is the final examination of the finished parts based on the manufacturing tolerances, and controlled by gages and other specifications.

"The following set of rules," suggests the author, "will aid in dimensioning component parts so as to

Topics Stir Automotive Thought of A. S. M. E. in New York

gages is contributed by Professor Wage incentive plan for in- operation, is presented.

avoid a number of involved manufacturing difficulties:

"1. Only one dimension in the same straight line can be controlled within fixed limits. This is the distance between the cutting surface of the tool and the locating or registering surface of the part being machined. Therefore, it is incorrect to locate any point or surface with tolerances from more than one point in the same straight line.

"2. Every part of a mechanism must be located in each plane. Every operating part must be located with proper operating clearances or allowances. After such requirements of location are met, all other surfaces should have liberal clearances.

"3. Dimensions should be given between those points or surfaces that it is essential to hold in a specific relation to each other. This applies particularly to those surfaces in each plane which control the location of other component parts.

"4. The initial dimensions placed on component drawings should be the exact dimensions that would be used if it were possible to work without tolerances. Tolerances should be given in that direction in which variations will cause the least harm or danger. When a variation in either direction is equally dangerous, the tolerances should be of equal amount in both directions, or bilateral.

"5. The initial clearance, or allowance, between operating parts should be as small as the operation of the mechanism will permit. The maximum clearance should be as great as the proper functioning of the mechanism will permit."

Considered broadly, gages are grouped into two classifications: A limit gage is one that checks a specified dimension, while a functional gage is one that checks the relationship of several dimensions to insure proper assembly.

"A gage," recommends the professor, "should be provided whenever its use is more economical than the use of standard measuring instruments. For example, if the total production of a certain mechanism amounts to about a dozen units, it would be gross extravagance to provide any special gages. On the other hand, if this production amounts to several thousand units, a complete set of gages is both desirable and necessary. The extent to which gages are necessary, therefore, depends in great measure upon the amount of the total production."

A survey recently completed by the author reveals the following inspection costs, classified by group needs, calculated as percentages of the factory payroll.

Class A—Household and office appliances such as washing machines, sewing machines, calculating machines, typewriters, telephone equipment, etc.
Cost of inspection from 2 per cent to 7 per cent
Scrapped parts from 1½ per cent to 5 per cent
These percentages vary in the different departments, depending upon the nature of the production methods and the design and requirements of the components involved.

Class B—Machine tools, electric motors, turbines, etc.
Cost of inspection from 5 per cent to 7 per cent
Scrapped parts from 1 per cent to 7 per cent

Class C—Automobiles, gasoline engines, agricultural machinery, etc.
Cost of inspection from 4 per cent to 10 per cent
Scrapped parts from 2 per cent to 7 per cent

Class D—Standard small tools, gages, etc.
Cost of inspection from 10 per cent to 20 per cent
Scrapped parts from 5 per cent to 25 per cent

Class E—Special tools, gages, fixtures, etc.
Cost of inspection—from 25 per cent to 50 per cent

In the discussion that followed, John Gaillard,

Prof. O. W. Boston, University of Michigan (right), and C. J. Oxford, National Twist Drill & Tool Co. (left), who offered a joint paper on power required to drill cast iron and steel

American Standards Association, mentioned the work of his organization in promoting an American standard for tolerances and limit gages. An interesting feature of his talk concerned the possibility of an International Standard, linking European and American practice. This led to the question, "Why an International Tolerance System?" In reply, Professor Buckingham said that its primary object is to effect economy in tools and gages, and to facilitate exports of these to European countries.

Prof. Fairfield E. Raymond, Massachusetts Institute of Technology, offered data on the use of fundamental formulae for economic production quantities in a paper on the advantages derived from the simplified formulae

"Turning With Shallow Cuts at High Speeds," a comprehensive paper dealing with tool life and its relation to cutting speed, feed and depth of cut, was presented by H. J. French and T. G. Digges. An unusual feature was the presentation of a new method of testing lathe tools by employing a special tool holder containing two tools, set side by side in parallel grooves. The first tool is the one to be tested, while the second is the "trailing" tool of standard form and material. The holder is so designed as to permit accurate positioning of both tools and adjustment for the same depth of cut. The failure of the experimental tool is established as the point at which the "trailer" begins to pick up the cut.

Carbon and high-speed steels of various compositions and heat-treatment were studied. With a constant feed of 0.0115 in. per revolution and a depth of cut of 0.010 or 0.020 in., tests indicate that there is a continuous increase in the life of high-speed steel tools as the cutting speed is decreased. Under the same conditions carbon-steel tools react sharply to changes in cutting speeds, as is evidenced by the fact that in many cases the change from very short life to very long life accompanies a decrease of only 5 ft. per min.

This investigation deals at length with the effect of various chemical elements, such as cobalt, nickel, aluminum, etc., upon the performance of high-speed steel alloys. The possibility of further promise in the use of cobalt, molybdenum and nickel as indicated.

"Power Required to Drill Cast Iron and Steel," dealing with the results of tests of standard twist drills ½ in. to 1½ in. in diameter on cast iron and steels, was presented by Prof. O. W. Boston and C. J. Oxford, before the Machine Shop Practice Division. Two types of tests were made: Commercial, according to the manufacturers' recommendations, and special, dealing with variations in recommended practice. Commercial tests dealt with determinations of thrust, torque and horsepower, while the special tests were designed to study the influence of each variable, such as feed, speed and drill size, to obtain some definite values of torque, thrust or power developed for any drill diameter at any speed and feed.

For speeds ranging from 76 to 441 r.p.m., and under constant condition of feed and lubrication, both torque and thrust remain practically constant for cast iron and steels. For constant drill diameter and speed both torque and thrust increase with increased speeds but at a slower rate. Results indicate that the type of steel, the carbon content and the microstructure are all important factors in the determination of the torque in drilling.

"Twelve Years' Experience With Economic Production Quantities," representing the control of the size of production orders by means of a definite formula for economic quantities, was presented by C. H. Best, of Eli Lilly & Co. The author shows that the use of economic production quantities has increased turnover, has reduced the number of batches produced and has reduced inventory 21½ per cent.

"Use of Economic Manufacturing Quantities," a paper dealing with the desirability of controlling production lots by means of definite formulae, correctly adapted to the problem, was read by Robert W. Kent.

"Advantages Derived From the Simplification of the Fundamental Formulae for Economic Production Quantities," read by Fairfield E. Raymond, assistant professor of industrial research, Massachusetts Institute of Technology, demonstrated the necessity for controlling the size of intermittent production lots by definite formulas. He presents a series of rational simplified forms suitable for every requirement and shows how these are applied to specific problems. A feature of the paper is a work sheet that can be used by any production man.

"Management of Service Departments—Budgeting and Wage Incentive Applied to a Large Organization," an achievement on a large scale of wage incentive for all classes of indirect - labor workers, was presented by William B. Ferguson and Tom H. Blair of the Newport News Shipbuilding & Dry Dock Co., where the plan has

M. A. Dietrich (above) and A. E. Flowers (right), both of the De Laval Separator Co., whose joint paper covered the subject of service characteristics of Diesel engine lubricating oil

rounded out 18 months of successful operation. This plant, employing over 6000 men, of whom more than 700 are on the indirect payroll, presents a complex problem in fluctuating seasonal demand and a multiplicity of non-repetitive tasks. Nevertheless, it was decided to install a bonus system in the hope that it would stimulate the day worker and salaried employee and effect some economy in operation.

The key to this plan is the determination of a rational basis for the bonuses. To this end the functions and amount of service for each department were analyzed and tabulated. Then two sets of figures were set up; one the gross budget and the other operating costs. These figures are taken month by month for a period sufficient to subtend the time from peak to slump, or vice versa. When plotted, these two variables result in two curves, and the divergence between them shows the difference between the set budget and the actual cost of operation.

The budget figure is expressed by the formula $B = K + Pn$, where K is a constant, or stand-by factor representing the cost of the department at a mythical zero of work, and P and n are variables which have different meanings for each department as shown in Table I.

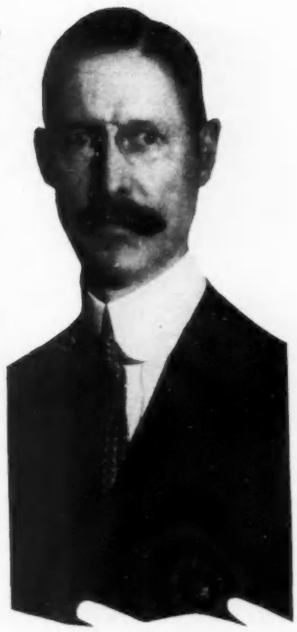
Initially, the budget is established on the basis of the cost for the preceding six months less the assumed stand-by charge, leaving a "net cost." "Then," continue the authors, "the percentage of net cost to gross budget figures for the same period is determined. This gives the stand-by, plus allowances, plus a percentage of the gross budget, which is to be the departmental budget. If the divergence between cost and the gross budget as plotted on the graph is too great, it can be taken care of by following the foregoing procedure for the six months at the peak (or slump) and plotting the results on a graph. Connecting these two points by a straight line gives the intermediate budget."

G.B. Karelitz, Westinghouse Electric & Mfg. Co., who presented the subject of performance of oil ring bearings to the A.S.M.E. at its 50th Annual Meeting in New York

The plan operates continuously on a six months' "rolling average"; that is, as a new month is added the early month is dropped off. The object of this is to smooth out seasonal variations and preserve consistency in bonus earnings. The bonus is paid monthly on a 50-50 basis, prorated among the employees in the department. The total amount paid is then charged into the next month's cost.

This plan offering, as it does, an opportunity to all employees including foremen, executives and technical men, has yielded a remarkable harvest in goodwill and increased productiveness. Perhaps a good measure of this is that the first year of the operation of this plan has shown a direct saving of $200,000.

In the discussion that followed, Paul Heck, Westinghouse Electric & Mfg. Co., South Philadelphia, mentioned that at this plant incentive is offered only to executives because of the difficulty of standardizing tasks. They use productive hours as a basis. A deficit in any month's operation is deducted from the next month's bonus.



A test code for high-speed steel for turning tools, a report of the A.S.M.E. special research work on properties of materials, was presented by Lewis H. Kenney, U. S. Navy Yard, Philadelphia

Carl E. Jones suggested that 12 months would be a better rolling average basis. He felt too, that a weakness of the scheme is the possibility of reduced earnings in lean years.

Prof. C. W. Lytle criticized the idea of charging back the bonus because that really reduces the amount of the earnings and suggested the use of the Rowan plan as a substitute.

"Present Practice in the Use of Cutting Fluids," a progress report of the A.S.M.E. Sub-committee on Cutting Fluids, compiled by S. A. McKee of the U. S. Bureau of Standards, is a statistical analysis of current practice in representative manufacturing plants. By virtue of this fact, it does not attempt to standardize cutting fluids or their use. But the report is valuable in that it shows striking inconsistencies in the use and selection of cutting fluids and thus focuses attention on this phase of the problem.

Prof. O. W. Boston, University of Michigan, supported by others, recommended thorough research work leading to a practical classification of cutting fluids and a codification which would simplify the selection of a cutting fluid for any given specific condition. He suggested a classification consisting of broad divisions, such as dry, aqueous, emulsions and oils, with each of these broken down to include subdivisions, and further amplification to include special trade-marked products. Among other things, the code would specify viscosities, temperature reference and a factor of oiliness if this latter could be determined.

TABLE I

Service Department Management

Method	P	n
1.	Standard or budget cost per unit n	Number of units measured; as (a) prints issued; (b) 1000 bd. ft.; (c) tons of steel handled; (d) cards punched.
2.	Cents per unit n	Number of employees in attendance in operative departments.
3.	Cents per unit n	Number of employees in attendance in yard (whole plant).
4.	Per cent of n	Dollars payroll of the service department (includes direct and indirect labor).
5.	Per cent of n	Dollars payroll of the division to which service belongs.
6.	Per cent of n	Dollars direct payroll of division.
7.	Per cent of n	Dollars payroll of yard.
8.	Per cent of n	Dollars direct labor of yard.

Bachrach

John W. Brussel, works manager, Timken-Detroit Axle Co.

Budget Control Pares Cost

Ratio of productive labor to sales is kept constant, while considerable savings are made, by means of clear cut system.

WHEN a single manufacturer produces axles made to 2148 different specifications, with 387 worm-and-wheel and 192 ring gear-and-pinion combinations, it seems well worth learning how his expenses are budgeted, how costs are controlled, and how the factory organization functions. We thought so, and, therefore, somewhat eagerly accepted the invitation of J. W. Brussel, works manager of the Timken-Detroit Axle Co., to call at his plant and learn something about its budget-control system.

When we learned that the ratio of productive labor to sales had remained practically constant despite brisk competition, a demand for lower selling prices, and accelerated decreased volume, also that an item such as power costs 21 per cent less than in 1925, and of a host of economies in other directions, we expected to find a complex system that might be hard to follow. As a matter of fact, the principles underlying the Timken budget system are clear cut, for they are based on common sense and a keen knowledge of men and shop methods which are the heritage of Mr. Brussel's service in automotive factories.

Budget control at Timken differs essentially from our conception of a budget in that it is not intended to act as a basis for limiting expenses. The function of the control system is to present a true picture of every item of expense in every corner of the plant. This information is segregated and recapitulated monthly, quarterly,

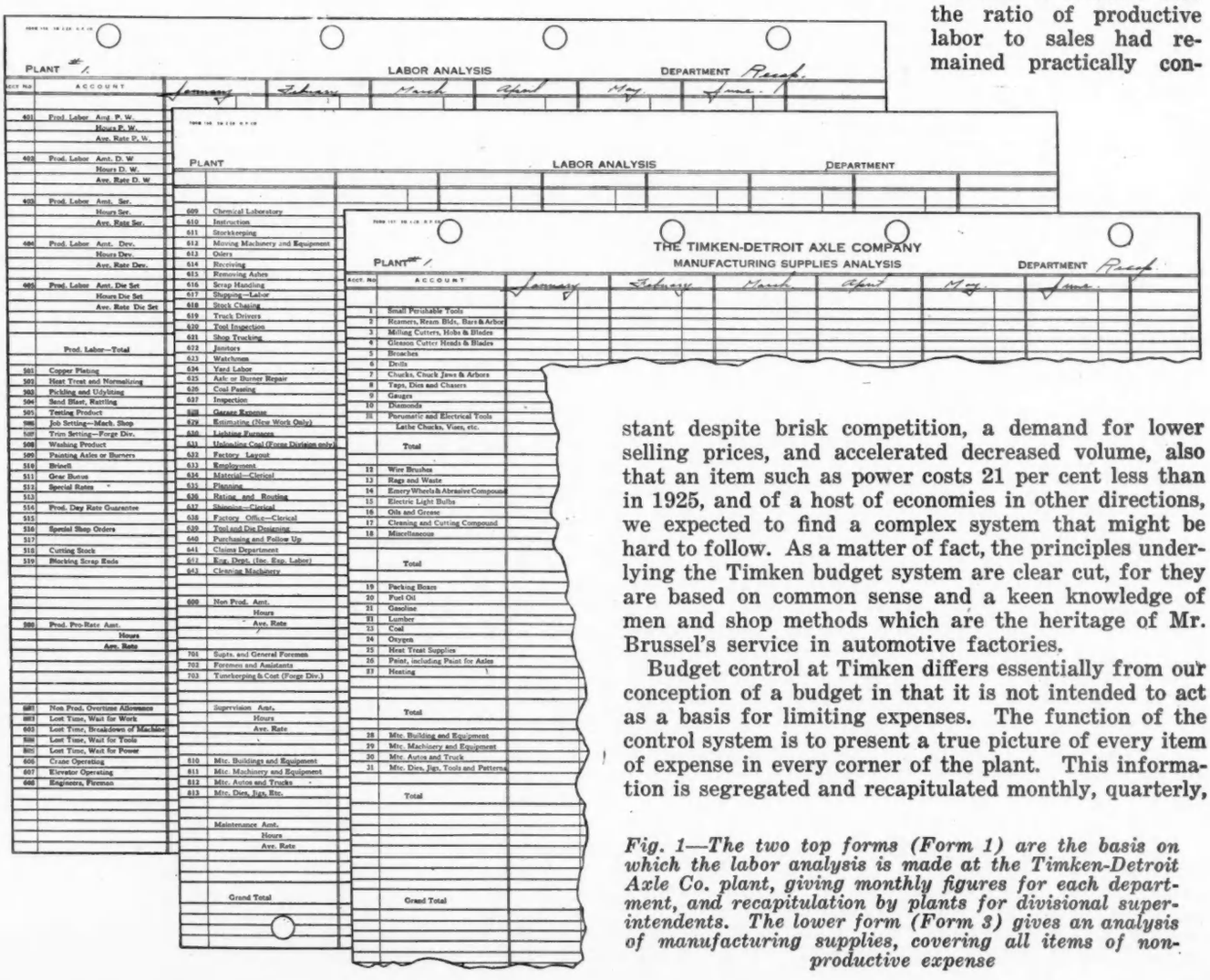


Fig. 1—The two top forms (Form 1) are the basis on which the labor analysis is made at the Timken-Detroit Axle Co. plant, giving monthly figures for each department, and recapitulation by plants for divisional superintendents. The lower form (Form 3) gives an analysis of manufacturing supplies, covering all items of non-productive expense

at Timken-Detroit Axle Company

By JOSEPH GESCHELIN

half-yearly, every nine months and yearly, making it possible to see at a glance the course of expense in each department, and its relation to the experience of the previous quarter, or the previous month or the previous year. Like the tariff, this control system is flexible but it is flexible in only one direction—downward. The keynote is unceasing revision of methods, materials and processes, in order to show a constant decrease in costs.

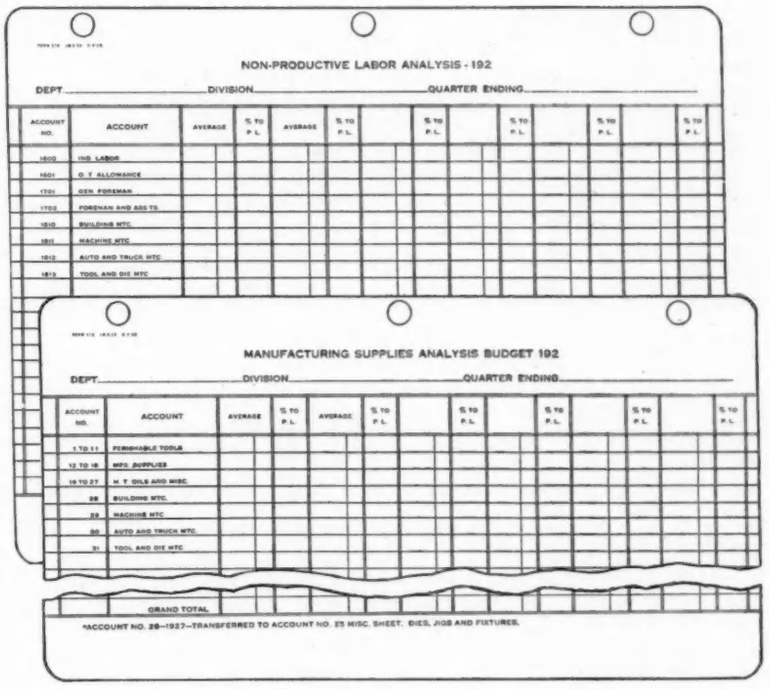
The purely accounting phase of this control system is well illustrated in the accompanying forms. Form 1 is the labor analysis which gives monthly figures for each department and a recapitulation by plants for the divisional superintendent. The labor analysis covers in detail every item of productive labor, non-productive labor, supervision and maintenance, as will be noted on the face and reverse side of this form. Form 2 is a recapitulation of non-productive labor analysis, which is made out for each department and summarized for each division. Form 3 is the manufacturing supplies analysis which covers in detail all items of non-productive material expense. Form 4 is the manufacturing supplies analysis budget which is the summary of the material given on Form 3.

The two last named forms constitute the non-productive materials expense control and are described in detail in the article on "Elimination of Waste," *Automotive Industries*, page 531, Oct. 12, 1929. All forms are kept up to date by information from the accounting department. And, as a final step, various key items are segregated and summarized on forms which the works manager keeps in his private file. Some idea of the scope of these summaries may be gained from the following partial list of them:

Variations in overhead.
Labor turnover.
Cost of scrap.
Cost of power.
Cost of compensation insurance.
Relation of productive labor to sales.
Relation of non-productive expense to sales.

Each summary gives the information for each division and department monthly, quarterly, semi-annually and yearly, with the corresponding cost for the previous year.

The basis of the entire control system lies in the cooperation of the management with the foreman and the men. The foreman is the manager of his department. Everything concerning his department is chargeable to him and he is obliged to watch every item of expense, scrap material, overtime, maintenance, etc. To help him accomplish this intelligently, and be indeed a manager, he is given a monthly report of the expenses in his department for every account. This report gives not only his current operating expenses, but compares them with the previous month and the previous quarter so that he has a definite basis on which to work. To make the picture more complete, the foreman signs all requisitions, signs all scrap tickets, approves the design of new tools or fixtures for his department, signs the requisitions for maintenance work and sees all reports on accidents. Consequently, he has a real control over all expense items. The weekly tool report, showing broken tools for his department, is another form in which the foreman is interested. This report reaches the foreman, the plant superintendent and the works manager. Excessive breakage or usage is immediately studied and remedied in some effective, satisfactory manner.


NON-PRODUCTIVE LABOR ANALYSIS - 192

DEPT. _____ DIVISION _____ QUARTER ENDING _____

ACCOUNT NO.	ACCOUNT	AVERAGE	% TO P.L.	AVERAGE	% TO P.L.		% TO P.L.		% TO P.L.		% TO P.L.		% TO P.L.
1600	IND. LABOR												
1601	O. T. ALLOWANCE												
1701	GEN. FOREMAN												
1702	FOREMAN AND ASS'TS												
1810	BUILDING MTC.												
1811	MACHINE MTC.												
1812	AUTO AND TRUCK MTC.												
1813	TOOL AND DIE MTC.												

MANUFACTURING SUPPLIES ANALYSIS BUDGET 192

DEPT. _____ DIVISION _____ QUARTER ENDING _____

ACCOUNT NO.	ACCOUNT	AVERAGE	% TO P.L.	AVERAGE	% TO P.L.		% TO P.L.		% TO P.L.		% TO P.L.		% TO P.L.
1 TO 11	PERISHABLE TOOLS												
12 TO 18	MFG. SUPPLIES												
19 TO 27	M. T. OILS AND MISC.												
28	BUILDING MTC.												
29	MACHINE MTC.												
30	AUTO AND TRUCK MTC.												
31	TOOL AND DIE MTC.												

GRAND TOTAL

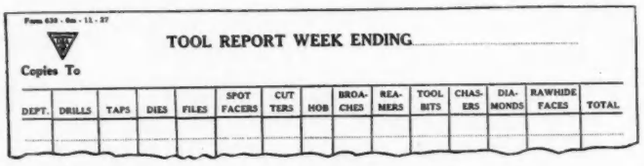
*ACCOUNT NO. 29—1927—TRANSFERRED TO ACCOUNT NO. 25 MISC. SHEET. DIES, JIGS AND FIXTURES.

Fig. 2—The upper form (Form 2) shows the recapitulation of non-productive labor accounts for each department and division. Form 4 (lower) is a budget for manufacturing supplies which summarizes the confirmation given on Form 3

Variations in the flow of production, relative size of manufacturing departments and other variables usually tend to complicate the working of a control system and make it difficult to evaluate the relative efficiencies of departments and foremen. This has been simply and effectively solved by setting up all figures on the basis of their ratio to the productive dollar in that department, thus making comparisons possible in terms of percentages. This principle is illustrated on Forms 3 and 4, where alternate columns show prices in dollars and cents and relations in terms of percentages. It is well worth noting, too, that this form of cost keeping serves as a yardstick for measuring the

capabilities of the foremen and is an excellent way of judging the work of a new foreman.

Special tools and fixtures for a new job are made on an appropriation based on an estimate of the probable


Form 630 - 6m - 11 - 27

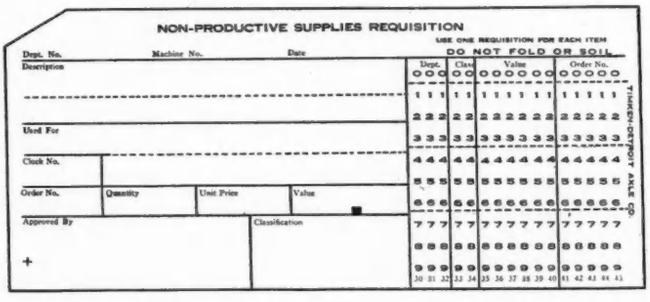
TOOL REPORT WEEK ENDING.....

Copies To

DEPT.	DRILLS	TAPS	DIES	FILES	SPOT FACERS	CUT TERS	HOB	BROA-CHES	REA-MERS	TOOL BITS	CHAS-ERS	DIA-MONDS	RAWHIDE FACES	TOTAL

Fig. 3—This tool report is sent weekly to foremen and superintendents, giving information on tool breakage during the preceding week

cost. The cost of this special equipment is always absorbed in the initial order or charged to the development account, consequently new equipment of this type is not set up as a charge against an individual foreman or his department. Nevertheless, the design of the new equipment is approved by the foreman and he is given the opportunity to review the design and make suggestions if he sees fit. When the tools and fixtures are completed, the foreman can recommend such changes or improvements as may be indicated by his experience with them, but these changes are charged to his department, and of course are not made unless they will pay for themselves. Such special charges appear on the foreman's monthly report, and in order to get a better picture of current expenses, the works manager judges the foreman on the basis of an average of three months. The practice in connection with new machine tool equipment is to have it pay for itself within one year. However, this handicap is modified if a new machine tool shows a marked advantage in floor space economy, or if it can produce a better product at the same or lower cost. Special machine tools are avoided except where they are necessary for high production on a group of similar parts, also in cases where the part requires some operation which can be accomplished only by a special machine.


NON-PRODUCTIVE SUPPLIES REQUISITION

USE ONE REQUISITION FOR EACH ITEM

DO NOT FOLD OR SOIL

Dept. No. Machine No. Date

Description

Used For

Clock No.

Order No. Quantity Unit Price Value

Approved By Classification

Dept. Class Value Order No.

TIMKEN-DETROIT AXLE CO.

Fig. 4—This requisition form is signed by the foreman for all items of non-productive material

Purchases of raw and finished materials likewise are covered by the control system. All parts have a standard specification developed by the standards or engineering department. Inventory reduction and control are accomplished by purchasing on a set maximum and minimum basis. Parts for standard units are stocked on a maximum and minimum monthly requirement based on previous experience. Small standard parts, such as rivets, lock washers, nuts, bolts, etc., are purchased in larger quantities in order to take advantage of the best price. Special parts required for specific orders are purchased in a quantity sufficient to cover the customer's order, plus some small amount for shrinkage.

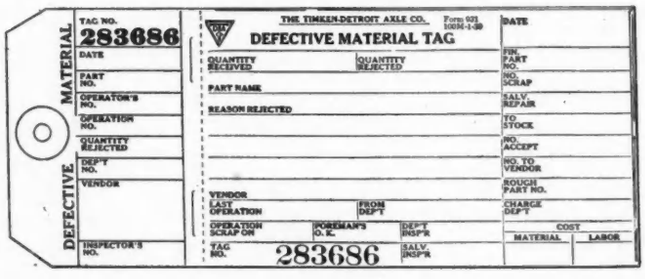
After gaining a perspective of the structure of the control system, the next inquiry is naturally directed to the mechanism of the system—of how and why it functions, who follows it, and how costs are controlled. Here again the foreman is the focal point. Every month when the figures are posted on Forms 1 and 3, each item is marked plus or minus, depending upon its relation to previous figures. The superintendent takes the plus items and, by checking through the departments under his supervision, can lay his finger on the department, or departments, responsible for the overage.

Subsequently, each questioned cost is studied and investigated and steps taken immediately to correct it. Then, too, the psychological factor plays an important role here. The foreman is placed on his own initiative and is constantly on the watch for improvements in methods, materials and tools. He is trained to study his problems and to make no recommendations until he is certain that the changes will pay for themselves, because the charges for these improvements are debited against his department.

Another element in the control system is the standards department. It establishes routings, tests tools and productive and non-productive materials. The established standards are filed with the purchasing department, which is obliged to work from these standards unless it discovers a suitable substitute that is acceptable to the standards department.

One of the most effective tools in cutting costs is the time study department. This department initiates time studies, establishes rates and is constantly checking operations in line with the latest developments in the art. The time study department consists of only five men who are constantly working from operation to operation throughout the plant, checking and rechecking. Their course is based on an established program, which is broken only when the foreman requests a time study on some operation that he thinks can be revised. And, finally, the entire structure is reviewed by the works manager, who can visualize it in its proper perspective by means of the special records set up for his use.

This common sense approach has another important bearing on the relations of the management and the foreman. No shop meetings to discuss difficulties, or ways and means, have been held for over a considerable period and it seems that this procedure may die out entirely. The works manager and the superintendent need no longer lecture to the foremen on generalities. some of which may not concern the individual, even


MATERIAL

DEFECTIVE

TAG NO. 283686

DATE

PART NO.

OPERATOR'S NO.

OPERATION NO.

QUANTITY REJECTED

DEPT NO.

VENDOR

INSPECTOR'S NO.

THE TIMKEN-DETROIT AXLE CO. Form 921 10M-1-30

DEFECTIVE MATERIAL TAG

DATE

QUANTITY RECEIVED

QUANTITY REJECTED

PART NAME

REASON REJECTED

FIN. PART NO.

NO. SCRAP

SALV. REPAIR

TO STOCK

NO. ACCEPT

NO. TO VENDOR

ROUGH PART NO.

CHARGE DEPT

VENDOR

LAST OPERATION

FROM DEPT

OPERATION SCRAP ON

FOREMAN'S O. K.

DEPT INSP'R

COST

MATERIAL LABOR

TAG NO. 283686

SALV INSP'R

Fig. 5—A combined tag and office record report of defective work at Timken-Detroit Axle plant. Every rejected part is checked by the foreman and all forms relating to rejections are signed by him

remotely. The figures are there for each department and only specific cases are discussed with a foreman. The summaries on file with the works manager are up to date, usable and quickly accessible, and it is rather

surprising to learn that one clerk can handle all this paper work and keep it constantly up to date.

Mr. Brussel has numerous really good ideas on management and what might be termed efficiency engineering. For example, when asked how he would begin to reorganize the cost control system in an existing plant, he replied:

"I would start with the scrap account, check every item of scrap material, trace it to its source and get its history. A careful survey would reveal leaks in processes, materials and capabilities of the men. In a reasonably large plant the scrap account is the best place to start."

The control system described here has effected remarkable economies. Probably the best way to show its effectiveness is to cite some of these accomplishments. Consider the labor turnover. In 1925, the monthly average was 33 per cent. Under the present system, with the full cooperation of the foremen who realize the detrimental effect of labor turnover, which by the way is charged to his department, the monthly average in 1928 was cut down to 5.6 per cent. Workman's compensation is directly linked with "safety first" methods and depends upon the vigilance of the foremen. Then, too, at the Timken plant, this is a direct departmental charge.

The net result is that in 1928 the cost of compensation was 77 per cent lower than in 1925, or a saving of many thousands of dollars a year. Marked economies have been possible in the scrap account because of the constant watching and publicity. In 1928 the average scrap account was 38 per cent lower than in 1925, indicating a saving of thousands of dollars each month in this account alone.

Favorable Prospect Seen for 1930

(*Continued from page 855*)

factual basis for disproving wild rumors about business declines and furnish a sound foundation for conservatively confident statements about the immediate future.

"In the period since the stock market decline average sales of department stores and of retailers selling insurance and toys have been equal to or slightly better than they were during the same period in 1928.

"Contrary to general opinion, only slight declines as compared with the similar period of 1928 have been recorded in retail sales of jewelry, a so-called luxury commodity, and automobiles, while similarly slight declines have been registered in the hosiery, show, plumbing, radio and optical trades.

"Definite, though minor, unpropitious effects on collections are already in evidence in some lines, notably those of passenger cars and jewelry, but no change for the worse in this regard is even hinted at by a majority of replies from toy retailers, insurance agents, department stores or hardware merchants.

"No drastic increases in retail stocks were apparent in October, this year, as compared with October, 1928, except in passenger automobiles. Motor truck stocks were lower than a year ago. Hosiery stocks showed a decline, while those of hardware, jewelry and department store merchants are at about the same levels as in October, 1928. Toy stocks are slightly higher.

"There is evidence that the intrinsic value of these retail stocks has been diminished, however, and a tendency appears in some lines to move goods now on the shelves to make way for new, fresh merchandise even at the cost of temporary reduction in profit margins. There is no evidence of general price-cutting, although an increased number of bargain sales have made their appearance in some lines.

"The effects of the market decline on instalment purchases previously made cannot yet be analyzed with any accuracy. Slight increases in the percentage of time buyers already have appeared in some trades. There is evident in many of the comments from both retailers and manufacturers a feeling that the final answer in this regard can scarcely be known for another one, two or three months. That some worry is being caused by possible adverse possibilities is apparent from comments contained in many reports.

"Automobile men are practically unanimous in agreeing that they have been hit, but differ materially in their estimates of the magnitude of the impression made.

"Reports from merchants outside the big industrial centers are particularly encouraging, those who rely on agricultural trade appearing for the most part unexcited about the whole stock market matter. The indication is clear throughout the reports from retailers that the big cities and industrial centers have been far more unfavorably influenced by the stock market decline than has trade in smaller communities.

"Bankers interviewed were generally of the opinion that the major effects of the stock market decline would not be evident for several months.

"A study of our financial history, banking authorities point out, shows that cheap money always has been a forerunner of business expansion and prosperity. Money may be cheaper than it is now, but we know that it is already relatively cheap. It is loaned freely on call at 4½ per cent, while time money is 4¾ per cent; the New York Federal Reserve Bank has lowered its rediscount rate to 4¼ per cent. At no time during the recent stock market decline did the rate for call loan money go above 6 per cent—a condition never before experienced in the history of America in any panic, whether business, financial or stock market. The result is that we find ourselves in a condition of not only having cheap money, but being already in a period of prosperity without having to go through the agonies of a period of business depression in order to get cheap money.

"If a stock market decline was inevitable, it could not have come at a more opportune time. Money is plentiful, prices of commodities are not inflated, and business is sound and healthy. Most people with a will to work are busily engaged. Inventories of most companies are relatively low. The winter months always experience a letting up in a number of industries, especially the automobile industry. Savings banks deposits are the largest in the history of the country. These are only a few of the many favorable aspects of our present business situation."

T. P. Wright, chief engineer, Curtiss Aeroplane & Motor Co.

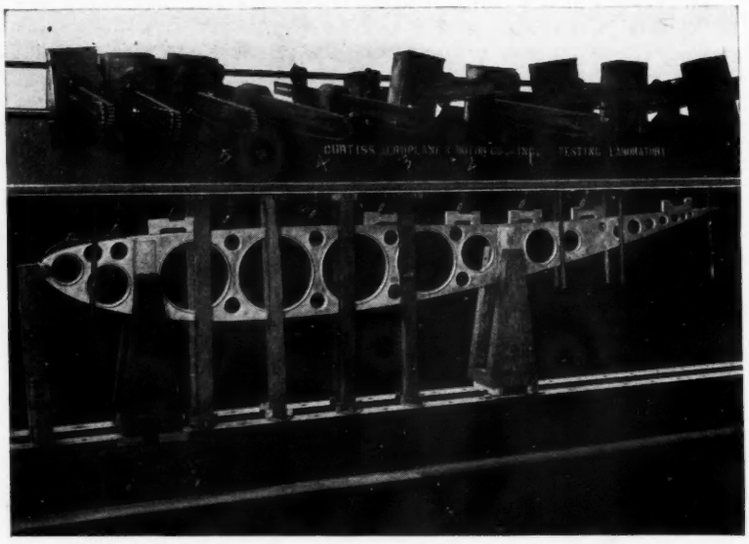
Curtiss-Wright Research Plant Is *Laboratory for Aircraft*

Company's aeronautical engineering department has been maintained intact since the war. Library is second only to Government records.

KNOWING to a small fraction of 1 per cent just what an airplane will be and do, while it is still "on paper" is an accomplishment which should be common to all properly organized airplane manufacturers, but which, on account of the youth of the industry, has been realized in only a comparatively few cases. Such a feat requires not only an experienced and thoroughly organized engineering department, but also calls for a well-equipped experimental plant.

The Curtiss Aeroplane & Motor Co., now a unit of the Curtiss-Wright Corp., maintains at Garden City a plant which is utilized almost exclusively for this purpose. It is here that all new ships of the company are developed, and it is here that the first few models of new products are actually built. It is only after the known uncertainties in design are all removed that the product is turned over to the production plant.

Curtiss claims for this plant a number of "only-s." It has, for example, the only commercial wind tunnel in the world. This wind tunnel is also the only one in existence to have an eight component balance. It is also claimed that here is the only aeronautical engineering department that has been in continuous existence since the early days of the art—the engineering department having been maintained almost intact even during the years following the war when demand for 'planes fell so low as to necessitate considerable curtailment of production forces. The company also claims the only aeronautical library and set of records that is anywhere near comparable, being second in their opinion only to the library and records of the Government. All of these lend to the accuracy and precision with which they are able to build a ship on paper and prognosticate with such a fine degree of accuracy just how that product will perform.



An experimental alclad rib under test for stresses in the special device at the Curtiss plant

Just as an example of the precision with which advance work is done by this organization, when the Condor, a ship built recently for the T.A.T. was completed and tested, it was found that the machine weighed 85 lb. less than originally estimated, and that the center of gravity, an essential feature in any airplane, was within ¾ in. of the point originally estimated. When it is considered that this plane weighs 11,352 lb. and has an overall length of 57 ft. 1 in., with a wing span of 91 ft. 8 in., it will be seen that this is an exceptional degree of precision in design.

The various steps in the procedure of the engineering department, which enable it to perform with such precision, and the organization of the department give a clear picture of what may well be expected of the average successful aeronautical manufacturing company of the future.

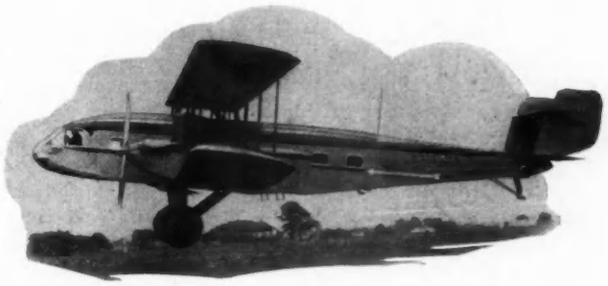
The Garden City plant houses the entire engineering department with a personnel of about 250, of which only a small proportion is clerical. The operating force in this plant is about 500. While some production planes, or planes for special order, are built in this plant, most of the operating department is engaged in materializing the products designed by the engineering department.

The engineering department is organized into a number of different groups, each of which functions independently of the others, but all of which coordinate their activities toward the attainment of one end. There is no promotion from one group to another, each group ranking equally and performing its necessary part of the whole job. In other words, the department operates functionally, and not militaristically.

In order to get an accurate picture of the functioning of the engineering depart-

at *Garden City* Development

By A. B. CROFOOT



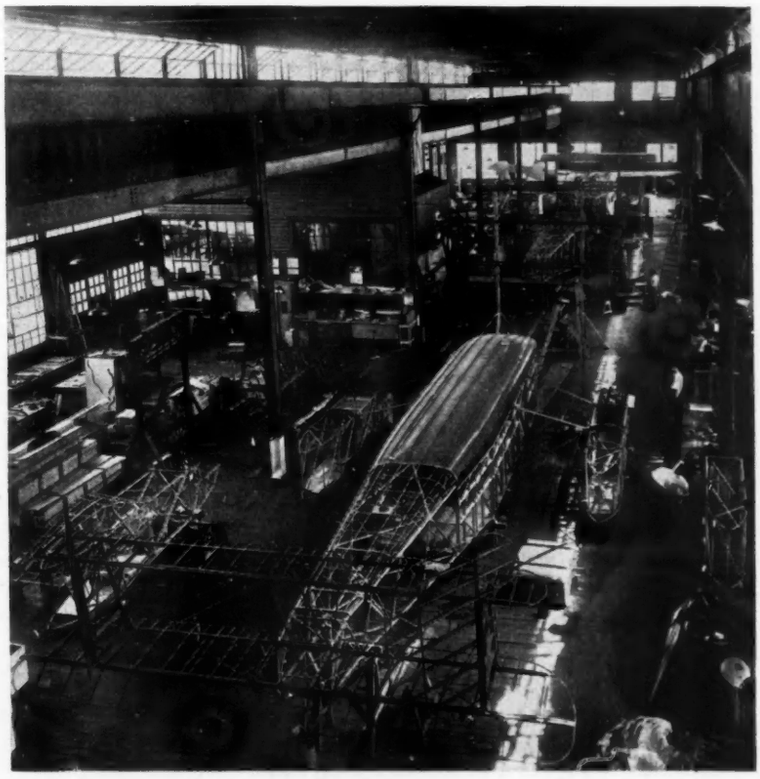
The Curtiss Condor cabin plane, built at Garden City for the Transcontinental Air Transport Co.

ment, perhaps it would be best to follow a job through from the time the idea is conceived until it is turned over to one of the production factories.

When the corporation officers determine that there is a demand for a machine with certain characteristics, that is, with a given pay-load capacity, a given cruising speed and radius, and fitted to meet certain conditions, the project is turned over to the engineering department at Garden City. The chief engineer then calls a meeting of a committee, consisting of himself and all section heads, which determines the elemental specifications of the plane, works out the preliminary designs and estimates the principal characteristics. As a result of this conference, a three-view drawing of the proposed plane, front, side and top, is prepared on a sufficiently large scale to determine the location of various parts and accessories. Also resulting from this meeting are descriptive specifications, a preliminary characteristic sheet, weight, performance and balance estimates.

Following this conference a project engineer is put in charge of the specific job, and the various sections are set to work analyzing the job from their various angles. The weight section analyzes each part of the proposed job carefully and determines the exact weight of each part proposed according to the preliminary specifications. If any part is found by this section to be heavier than originally estimated, it is referred to the design department for redesign to meet the requirements. When the weight of each part has been accurately determined from the drawings and has been satisfactorily adjusted to fall within the requirements, the tables are approved by the section head who is then held responsible for the accuracy of the figures. As each part is made in the shop, it is weighed and checked against the figures prepared by the weight section, and when the complete job is assembled it, too, is weighed as a final check. An idea of the exactness of the work of this section is secured from the figures quoted above which show that in the Condor the final weight of the ship was less than 1 per cent off from the original estimate—and this difference was on the light side, which is extremely favorable in a construction such as an airplane where every ounce counts.

The design section prepares detailed drawings and specifications of any special fittings or parts that are required in the construction of this particular job. Their work involves particularly the design of any special fittings; the design of any parts which may vary slightly from parts already available but which may be required to meet the specifications, and any other details of design peculiar to the plane in view. One member of the design section is placed in charge of a specific job, and if it is large there may be an assistant designer assigned who will be responsible, under the project designer, for the design of certain sections of the whole job. The designer assigned to the project is responsible to the project engineer for the accuracy and completeness of the design work on the project.



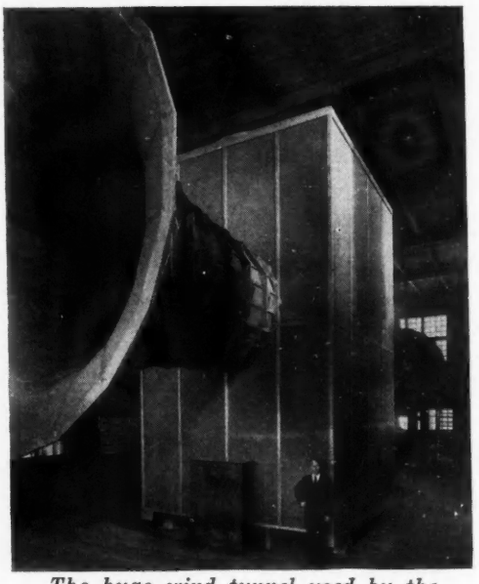
The Curtiss Aeroplane & Motor Co. shop, showing a giant Condor under construction

The structural section also contributes to the completed job by preparing stress analyses on the various members of the job and determining the strength of the various members entering into the completed job. This section is held responsible for assuring sufficient strength in the various members to withstand the stresses of actual flight conditions.

The aeronautical research section, in addition to the function which its name implies of conducting research, ana-

lyzes the aerodynamic qualities of the project. This section has charge of the wind tunnel and here tests under actual flying conditions an accurately made scale model of the completed plane. This model is made exactly to scale, but small enough to be gaged accurately in the tunnel. It is then mounted on the spindle where it is tested for all possible flying conditions. This tunnel measures to one ten-thousandth of a pound the stresses and strains along all three axes, the torsional strain about these axes and all combinations of these strains simultaneously. Through the investigations of this department, the actual performance of the completed plane can be foretold to a fine degree.

The wind tunnel itself has a 7-ft. shaft of wind, but in order to obviate any inaccuracies due to the drag of the sides, the models used for test have a 30-in. span. These models are complete and accurate in detail so that when mounted on the spindle and placed in front of the wind shaft, they actually fly—the only difference being that the air is moving past them while they are held stationary on the spindle instead of their moving through the air. Their flying characteristics, response to controls, and stability in all positions are accurately measured as already indicated to an accuracy of 0.0001 of a lb.



The huge wind tunnel used by the Curtiss aeronautical research section for measuring stresses on planes under actual flying conditions

When all the detail specifications and analyses have been completed, the job is placed in the shop and the ship is actually built, under the direct supervision of the project engineer. Usually three models are constructed, each one varying in certain details by adding improvements progressively, until the third ship is completed as the production model.

When the ship is completed and finally weighed, it is turned over to the flight section which is made up of expert pilots who in addition are experienced engineers. These men take the ship up in the air and put it through its paces. Because of their engineering knowledge they are able not only to tell whether the ship handles as it should or not, but if it does not, they can tell why this is so.

Meanwhile the production engineering department has been analyzing the ship from a production angle, to ascertain what may be needed in the way of new jigs, dies and tools in order to manufacture the ship commercially. These men are experienced production men and are able to translate the work of the designers into terms of large scale production.

After these departments have completed their work, they compile reports in which are incorporated changes suggested, particularly by the flight and construction sections who may recommend changes to make the ship handle more easily, or to make its commercial production economically profitable. The original committee then meets again, decides what of these suggested changes shall be adopted, and finally approves the ship, which is then turned over to one of the production plants for commercial manufacture. If it is a military ship, it is usually turned over to the Buffalo plant. If it is a commercial plane, it is more apt to be turned over to one of the other manufacturing units, such as the Curtiss-Robertson St. Louis plant.

In addition to the sections mentioned which engage in the actual design of new products, there is a special section of the engineering department devoted to propeller studies and there is also a materials section. This section devotes its time, as its name implies, to studies of materials that are used or might be used in airplane construction. Particular attention is paid by this section to new alloys, which because of their strength or their lightness may lend themselves to improvements in airplane construction.

Very little special equipment is required by the engineering department. There is a completely equipped chemical laboratory, for analysis of materials chemically, and there is also a complete laboratory for testing strengths of materials and parts. This latter laboratory has the usual tensile, shear and compression testing devices, and is equipped to test all parts to destruction. There is a special tensile strength testing machine, built to test 10-ft. struts, but outside its unusual size, it differs from the usual machine of this type in no particular.

The wind tunnel has already been discussed. The engineers here have also developed for their own use a machine for testing the strength of wing ribs, which is rather unique but comparatively simple. As is seen in the accompanying illustration, the wing rib is supported on trunnions at the points where it is ordinarily joined to the beam. The various points where loads are to be applied are then placed under the upright rods of the machine and the containers, shown on the transverse bars, are filled with sufficient shot to produce the desired load. There is at the right-hand end of the machine (not shown in the illustration) a hand wheel which operates the long rod in back which in turn is connected through sprockets to the chains extending out on the transverse bars. The shot containers are attached to these chains so that when the wheel is turned, the containers are moved out to increase the load on all points simultaneously. It is thus possible to produce double or triple the loads required by Department of Commerce regulations, or even to test the rib to destruction.

The flight section is at present trying out a new device known as the dummy observer which so far seems to be working satisfactorily. This is merely a moving picture camera which makes a record of all the instruments. A study of the resulting film which shows a clock along with the other instruments shows accurately the climb, degree of stability and other characteristics shown by the ship in flight. For particularly detailed flight tests, the controls are operated through spring balances instead of directly by the stick and rudder bar, so that the amount of effort required to put the ship in any position can be measured.

Flight tests are also sometimes conducted with particularly sensitive altimeters capable of measuring the difference in height between the floor and a desk top. As this altimeter requires constant adjustment of its zero point, it is impractical for use in regular flight, but it does serve for measurement of certain conditions in test flights.

Johnson Four-Speed Transmission Is Unusually *Compact*

Unit is of the internal gear type, having no direct drive. High speed is rendered silent by overlapping tooth-action and use of nitralloy in spool gear.

A NEW four-speed transmission employing internal gears for the two higher speeds and also, in part, for the emergency low speed, has been developed by the J. P. Johnson Engineering Co. of Cleveland, Ohio. A longitudinal and a cross section of this transmission are reproduced herewith. The feature which distinguishes it from other transmissions of a similar type is that the shaft through which power is carried into the transmission at the front and the main driveshaft which projects from the transmission housing at the rear are not coaxial, but are offset by an amount which is equal to the eccentricity of the internal gears and their spur pinions.

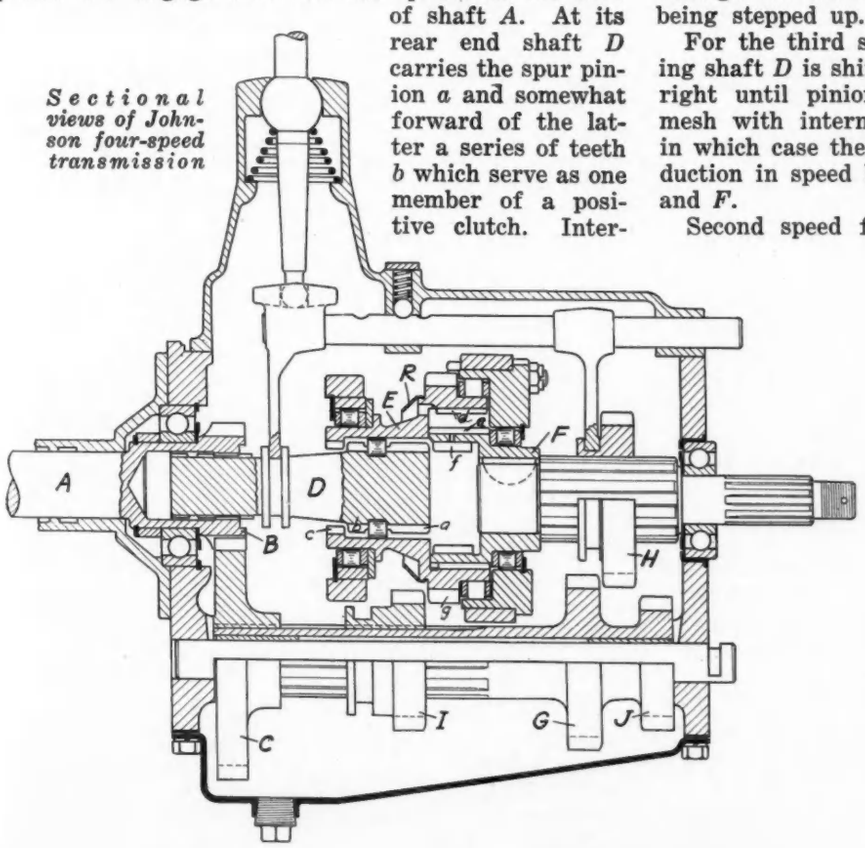
Referring to the drawing, the shaft *A* carries the usual constant mesh pinion *B* which meshes with gear *C* on the countershaft, so that the countershaft rotates whenever the engine is running and the clutch engaged. Shaft *A* is bored out at its rear end to receive the forward end of a sliding shaft *D* which is formed with splines that engage with internal splines in the bore of shaft *A*. At its rear end shaft *D* carries the spur pinion *a* and somewhat forward of the latter a series of teeth *b* which serve as one member of a positive clutch. Intermediate between pinion *a* and clutch member *b* there is a series of rollers by means of which the rear end shaft *D* is supported in what may be described as a spool gear *E*. This latter has two series of internal teeth formed upon it, set *c*, which is adapted to mesh with the teeth of clutch member *b*, and set *d*, which is adapted to mesh with spur teeth *e* on a member *F* keyed to the main driveshaft. Member *F* also has a series of internal teeth *f* which are adapted to mesh with the spur pinion *a* of sliding shaft *D*. Spool gear *E*, it will be noted, is very substantially supported in two roller bearings mounted in tunnels formed in the housing.

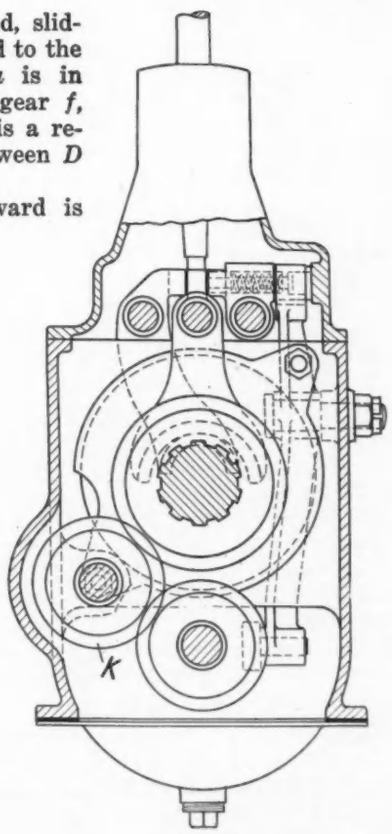
The way in which the two higher speeds are obtained will now be readily understood. For high speed, sliding shaft *D* is shifted to the left until the clutch members *b* and *c* are engaged, thereby placing spool gear *E* in direct driving connection with shaft *A*, *D*. Power is then transmitted from spool gear *E* to member *F* through the internal gear combination *d*, *e*, the speed being stepped up.

For the third speed, sliding shaft *D* is shifted to the right until pinion *a* is in mesh with internal gear *f*, in which case there is a reduction in speed between *D* and *F*.

Second speed forward is

Sectional views of Johnson four-speed transmission





obtained in the usual manner through the constant mesh gears *B*, *C* and the second-speed gears *G*, *H*, while for the emergency low speed there is provided a sliding pinion *I* on the secondary shaft which can be slid into mesh with the low-speed gear *g* forming part of spool gear *E*. The reverse speed also is obtained in the same manner as in conventional transmissions, through the constant mesh gears *B*, *C* and the reverse gears *J*, *K*. The reverse gear *K* is adapted to mesh with gear *H*.

As usual in four-speed transmissions, three slider bars are employed, the gears being shifted selectively. The shift is similar to that of four-speed transmissions now in regular use. While the emergency low-speed gear is not positively latched out, to engage it it is necessary to compress a coiled spring behind a plunger mounted in a socket in the gearcase cover, which prevents engaging the low speed by mistake.

Special attention has been given to the problem of lubrication. The sliding pinion for the emergency low speed is located directly below the internal gear, and by centrifugal action it throws oil up into the oil-trap ring *R* secured to spool gear *E*. This is said to furnish a plentiful supply of oil to the large internal gear at all times. The smaller internal gear is lubricated by oil being trapped in the small opening of the large internal gear and carried rearward into the smaller of the two internal gears. A plentiful supply of lubricant to these gears is of importance on account of the effect it has on their quiet operation.

In this transmission the power is at all times transmitted through one pair of gears. The sliding shaft *D* is supported in the spool gear by 15 ⅜-in. Norma rollers, which are placed side by side without any retainer and fit closely into the roller groove turned in the sliding shaft, but with enough axial clearance to permit easy shifting. This bearing operates at comparatively low speed, as the parts which it separates rotate in the same direction, with a speed difference of 42 per cent between them when power is being transmitted through third speed, while there is no motion between them on top gear.

Pinion *a* has 17 teeth and internal gear *f* 21 teeth, these teeth being of 10-12 diametral pitch with a 30-deg. pressure angle. Internal gear *d* has 42 and pinion *e* 38 teeth, these teeth being of 15-18 diametral pitch, with a 25-deg. pressure angle.

Tooth Action Overlaps

We understand that the chief problem that was encountered in the development of this transmission was to make the fourth speed sufficiently quiet to overcome any objections to its continuous use. By the use of large numbers of teeth the tooth action is made to overlap, that is, more than one pair of teeth are in contact at all times, which tends toward increased quietness. Another improvement made to reduce noisy tooth action consists in the adoption of nitralloy for the spool gear *E*, to reduce or eliminate tooth distortion in hardening.

One claim made for this transmission is that for a four-speed transmission with quiet third and fourth it is unusually compact. Besides, the shifter fork engages the spool gear at a groove of comparatively small diameter, hence the frictional losses at this point are reduced.

The speed ratios obtained with this transmission in the different positions are as follows:

First	3 to 1	Third	1.235 to 1
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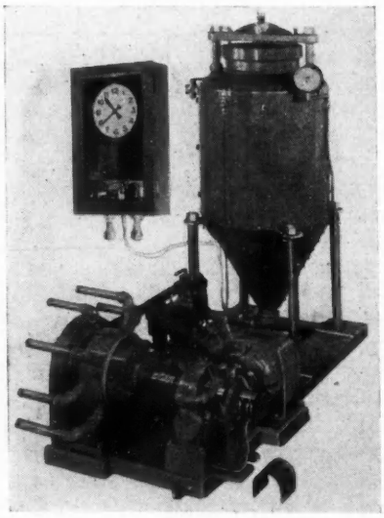
	Reverse	2.7 to 1	

In addition to use for original equipment, this transmission lends itself well to replacement on old cars whose owners may wish to secure the advantages of a fast rear axle. For instance, if the transmission were mounted in a car with a rear axle reduction of 5 to 1, the total reductions between the engine and rear axle would be 4.375 on fourth and 6.175 on third.

We understand that a number of these transmissions have been built and installed during the past several years, but none of those built up to recently had the spool gear made of nitralloy. The manufacturing cost of the transmission is claimed to be comparatively low.

Pneuma-Lectric Lubrication

A NEW automatic lubricating system for mills and plants where grease is used as a lubricant has been announced by the Keystone Lubricating Co., Philadelphia.



Keystone Pneuma-Lectric installation for automatic lubrication, with intermittent feed, of mill machinery when grease is used as a lubricant

The Keystone Pneuma-Lectric lubricating system provides complete automatic operation with intermittent feed adjustable to the requirements of the unit being served. One of its important features is the electric clock feed control, by means of which the bearings may be lubricated at intervals of from once in 5 min. to once in 24 hr. This system combines the Keystone pneumatic safety lubricator and the new Keystone rotary distributor. The pneumatic lubricator is served by a motor compressor unit with an automatic pressure switch. This maintains the correct working pressure in the header line leading to the distributor. The distributor is operated by a motor through a speed reducer. Operation is controlled by an electric clock which may be set to any predetermined time period of operation.

When the time period has been reached, the clock actuates the relay, which in turn applies current to the motor. The motor operates the rotary distributor, which delivers a charge of grease to each bearing consecutively. The motor continues to run for about 12 sec. until the clock breaks the contact.

To prevent the distributor from stopping on an open port, a drum control switch is employed. This keeps the distributor in motion until the safety zone is reached, when the shunt electric brake functions and stops the motor.

Furthermore, should the master switch be opened while the distributor is operating, the drum switch will cause it to complete its cycle and stop in the safety zone.

The distributor is made in two sizes, one with eight outlets, the other with 24 outlets. For larger installations, one clock and one lubricator unit may be arranged to operate two or more distributors.

Eisemann Announces Two *Magnetos* of *Weatherproof* Construction

Models for four and six-cylinder engines are offered. The GV-4 has a brush-type distributor while that of the GV-6 is of the gap design. Several options included.

EISEMANN MAGNETO CORPORATION of New York has marketed two new models of magnetos, the GV-4 and the GV-6, for four and six-cylinder engines respectively. One of the chief claims made for the new instruments is that they are so well enclosed that they need no further protection (such as that of a leather boot, for instance), against dust and the weather, even when used on agricultural machinery.

Eisemann ignition magneto Model GV-4

As may be seen from the sectional view reproduced herewith, the magneto has a die-cast housing which has the pole shoes cast in and the permanent magnet—of U-type—applied to it on the outside. The main housing is extended at the distributor end to enclose the distributor drive gears. These gears are made up of a steel pinion and a driven gear of non-metallic material. To the extension is bolted a housing for the collector ring on the armature shaft and the distributor above it. The distributor disk is set into an opening in this housing and the interrupter is mounted on it over another opening concentric with the armature tunnel. In the GV-4 model a brush-type of distributor is used, while that on the GV-6 model is of the gap type.

The armature is of *H* form, and the armature poles are extended axially and have the shafts secured to them by screws. The condenser is located within the extension of the armature at the driving end. The low-tension terminal for connection to the magneto switch is mounted on a cap of molded insulating material over the interrupter. While the armature is mounted on ball bearings at both ends, the distributor is mounted on a single plain bearing. Wick lubrication is provided for this bearing, from a well formed in the main housing.

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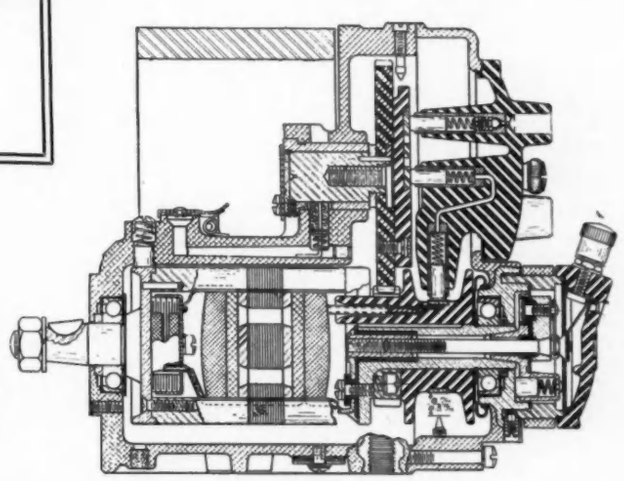

Section of Eisemann GV-4 magneto

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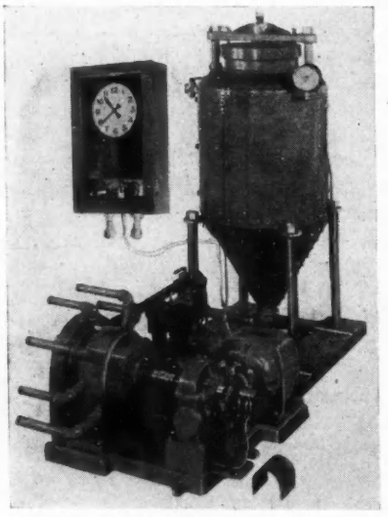

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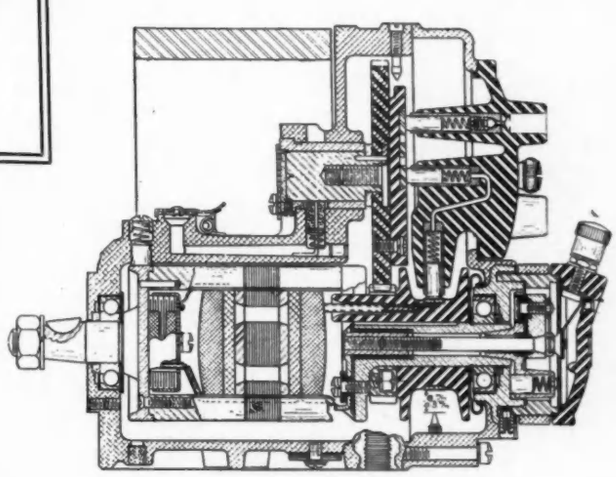


Section of Eisemann GV-4 magneto

Measure of Shock Absorber of Automobile *Spring*

Instrument shows direction oscillations during giving picture

By E. W.
Trundle Engineering

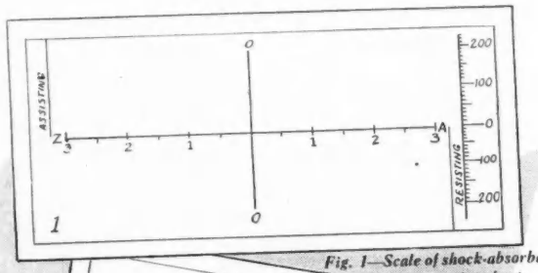


Fig. 1—Scale of shock-absorber action charts

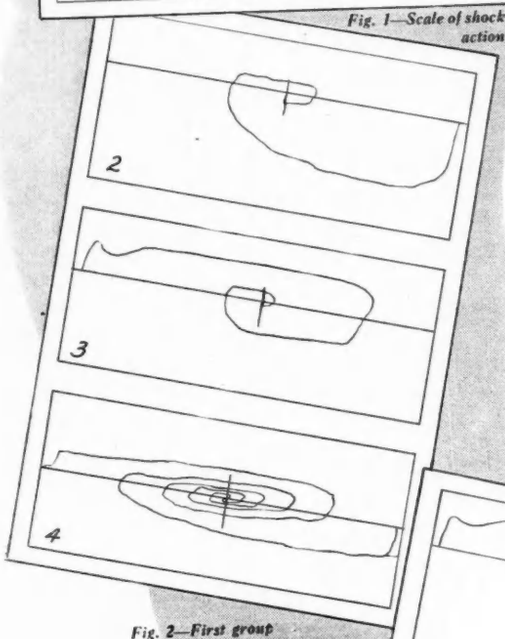


Fig. 2—First group

MUCH effort has been spent on attempts to measure or define what constitutes a good ride. The problem has been approached from many different angles, even to the point of quantitive measure of the evidence of fatigue as shown by physical deterioration.

Everyone in the industry realizes the necessity of building into the passenger car such elements as will produce an acceptable ride to the buying public, in fact every element of the car from tires to upholstery must contribute toward that end. Tires, tire pressure, chassis springs, spring mounting, spring controls, seats, cushion and back springs all have a direct bearing on the comfort of the rider, but none of them, taken alone, even though developed to the highest possible point, has a preponderant influence. The performance of most of the above mentioned units is susceptible of measurement in quite definite terms. Spring control (so-called shock absorber) performance has lacked a definite method of measurement. It is the object of this article to present such a measure, or at least to point out a way toward the development of such a

The group of diagrams shown herewith are indicator cards used to register the actual oscillation of chassis springs when regulated by shock absorbers. Fig. 1 (top) is the scale of action, the travel of the line along A-Z being produced by vertical spring travel. The normal loaded position is shown at the intersection of O-O

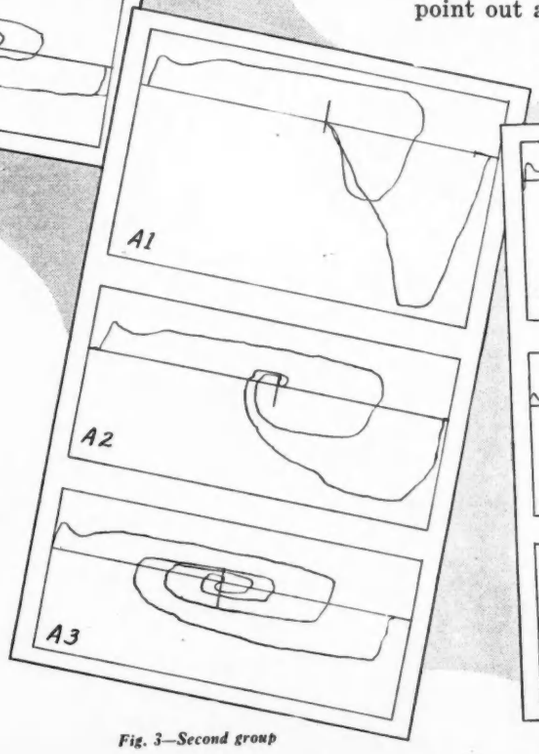


Fig. 3—Second group

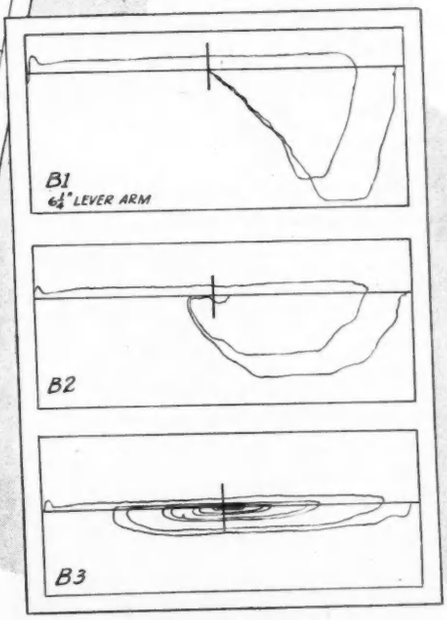


Fig. 4—Third group

Performance Developed as Index Action Under *Deflection*

and magnitude of entire cycle, of movement.

WEAVER
Co., Cleveland

measure for experimental or practical inspection and use.

The function of the chassis spring is to cushion the effect of the surface inequalities as the vehicle travels over the road, so that shock to the passenger is mitigated if not entirely eliminated. In general, this is the result, but the secondary effect as the spring recoils after a sudden compression is not so good; in other words, the energy stored up in the spring by the sudden compression caused by a bump must be eliminated smoothly if comfort is to be attained. For many years friction, produced by mechanical means, was used to dissipate the energy and slow up the action of the spring recoil. Devices of this type are recognizable by the use of a strap or cable connection between axle and frame.

Another school of thought has felt that a proper energy-absorbing unit could be made to work in both directions and so produce a better ride and eliminate some of the grief coming on the springs. The past two years have witnessed a very marked trend toward the adoption of two-way type units in which energy dissipation is obtained by

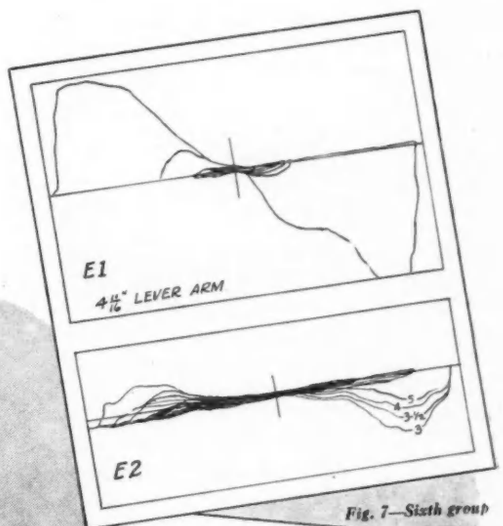


Fig. 7—Sixth group

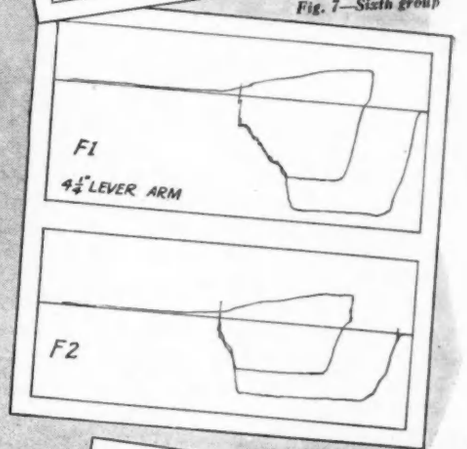


Fig. 8—Seventh group

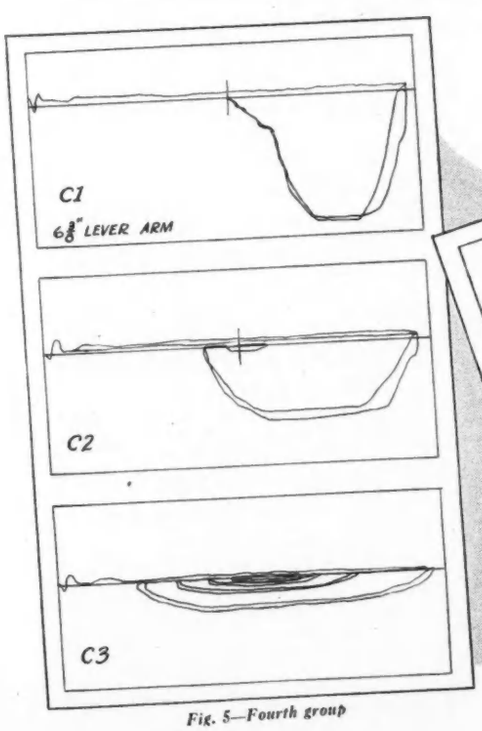


Fig. 5—Fourth group

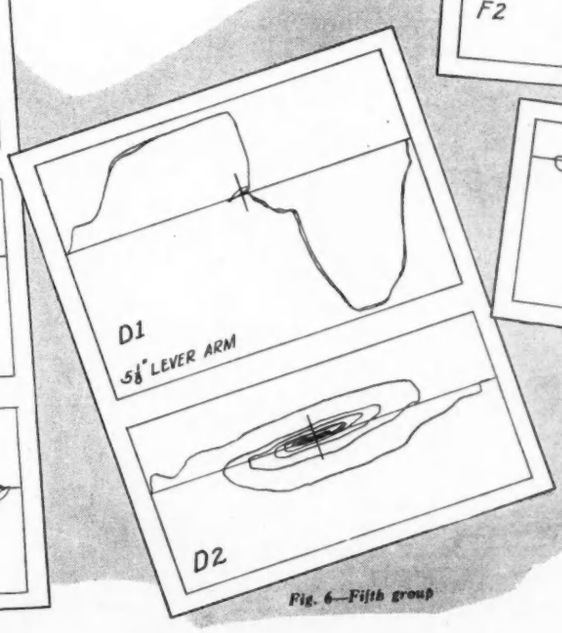


Fig. 6—Fifth group

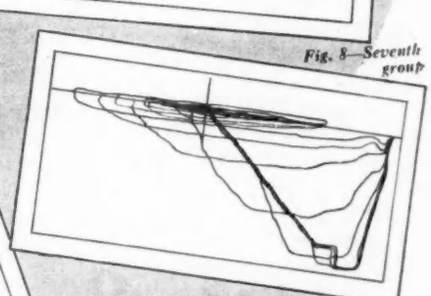


Fig. 9—Sample from eighth group of charts, permitting of a study of adjustments. Nine starts from position A are indicated. Note lack of influence for last few positions.

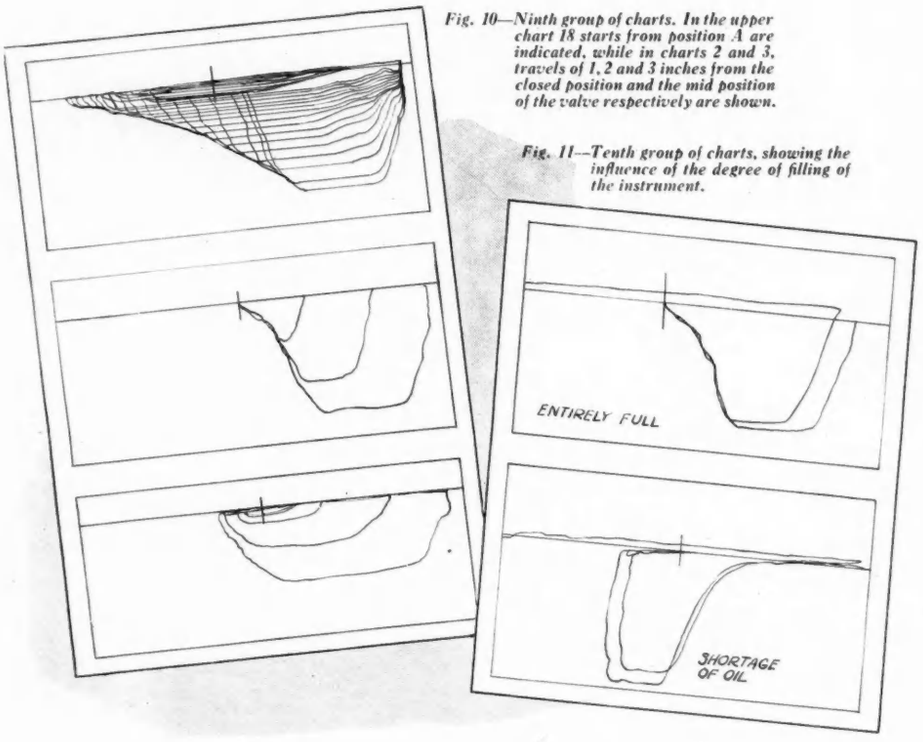


Fig. 10—Ninth group of charts. In the upper chart 18 starts from position A are indicated, while in charts 2 and 3, travels of 1, 2 and 3 inches from the closed position and the mid position of the valve respectively are shown.

Fig. 11—Tenth group of charts, showing the influence of the degree of filling of the instrument.

forcing liquid through small orifices at high pressure.

The relative motion of frame and axle actuates the moving element of the shock absorber, the link connection being of a type to take both tensile and compressive stress. Spring movement is limited to a few inches of travel, about 3 in. either above or below the normal loaded position. Our efforts have been directed toward a means for determining the instantaneous load, both in direction and in magnitude, that is imposed on the link as the spring goes through a cycle of operation under known conditions.

In the effort to sense, to measure and to record what goes on at the link connections, use was made of a mechanism similar to that used for taking steam engine indicator diagrams. A large coil spring loaded to a predetermined amount was used for producing an actuating force. Referring to Fig. 1, the travel of the stylus in a horizontal direction along line *A-Z* is produced by the vertical spring travel. The normal loaded position is at the intersection of lines *A-Z* and *O-O*.

The resistance offered by the instrument as transmitted by the lever arm is communicated to the stylus in a manner to deflect it both in direction and in magnitude, to record its action at every instant during the cycle, thereby drawing the irregular shape on the card.

The first group of charts merely led up to a typical test of release from a displacement 3 in. above and below normal position.

In all of these tests temperature conditions were uniform (70 deg. Fahr.). The liquid was as supplied by the manufacturer of the instrument. The scale of the spring was 180 lb. per in. deflection. The total load on the spring was about 600 lb., and the period of the spring about 80 oscillations per minute. Tests were made in most cases at practically closed, mid position and open position of the adjusting valve.

The second, third, fourth, fifth, sixth and seventh groups show typical performances of various makes of instruments that were available for test.

The eighth group, of which only one is reproduced, shows the results obtained by adjustments, the lower card indicating that on one end of the scale adjustments may be made with no particular effect.

The ninth group shows the results of adjustments of another make of instrument and also the action from a displacement of 1 in. and 2 in. as well as the standardized distance of 3 in.

The tenth group shows the results obtained with a perfect instrument completely filled with liquid as well as in the only partially filled condition.

Conclusions

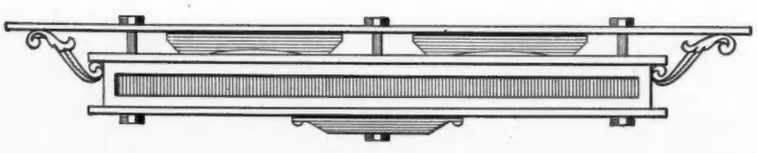
1. There is a difference of opinion among designers as to where and how the resistance should be applied in the spring movement cycle.

2. The rate of travel of the spring in these tests was too slow to bring out the actual resistance caused by upward thrusts from road at high speed, but it is fair to assume that there will be a definite relationship as shown by the graphs. If a new machine was to be built it would be well to incorporate means for imparting dynamic blows for this side of the cycle.

3. A very good picture of the relative performance of the instruments was obtained under the operating conditions of the test.

4. There are several uses for the development:
   - A. As a laboratory tool in the development of control instruments.
   - B. As a recording inspecting method for the product.
   - C. In connection with chassis springs and mountings, to develop spring suspension of the vehicle.
   - D. In connection with service station work, where the present immeasurables leave opportunity for argument between the seller and customer.

5. The spring control that enables road inequalities to be smoothly absorbed and the spring restored to its position of static equilibrium smoothly and most quickly is nearest to the ideal.



Brill Governor Controls Speed and Regulates *Engine Load*

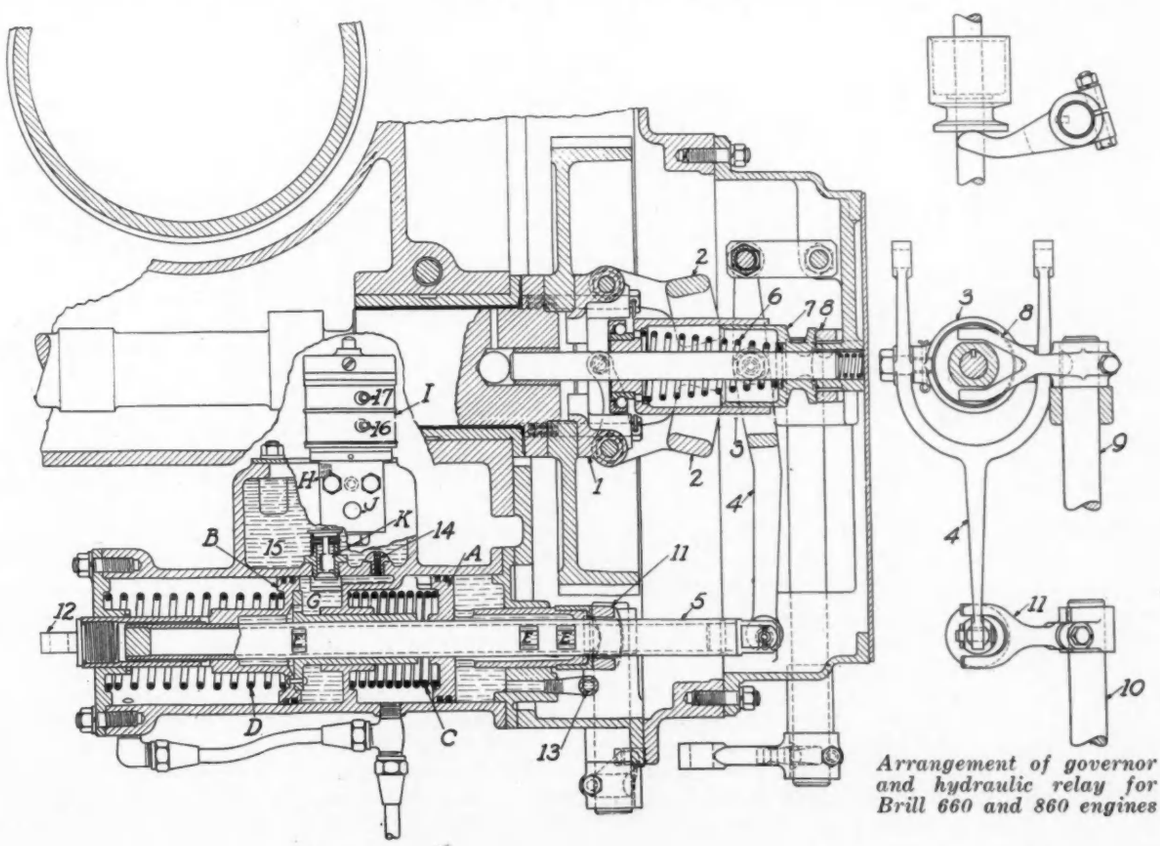
Unit operates through an hydraulic relay in which valves are actuated directly, and makes use of pressure derived from the powerplant's lubricating system.

IN connection with the new Brill Models 660 and 860 powerplants described in *Automotive Industries* of Oct. 26, use is made of an hydraulic relay which amplifies the power of the centrifugal governor. In these engines, which are made for gas-electric drive railcars, the governor not only varies the throttle opening in accordance with the load on the engine, but also changes the setting of the generator field rheostat, to modify the load capacity of the generator with changes in its speed.

A sectional assembly drawing of the entire device is shown herewith, with the aid of which its operation may be readily understood. In the drawing, 1 is the governor-weight carrier, which is mounted on the camshaft gear and rotates at camshaft speed, and 2 represents the governor weights, which react against a sleeve 3 to which the lever 4 is pivoted, this lever in turn being connected to the tube 5. The governor weights are opposed by spring 6, the pressure of which can be adjusted by varying the position of stop 7. This adjustment is made by means of lever 8, which is connected to the hand control of the engine through shaft 9. This hand control is connected also to shaft 10 which, through lever 11, acts to close the carburetor throttle, which is normally held open by a spring.

The tube 5 is provided with ports in its wall which serve as exhaust or transfer ports for the hydraulic relay which amplifies the power of the governor. This tubular valve 5 is balanced, and the only power required for shifting it is that necessary to overcome the friction encountered by it. Its total travel is 3½ in. This valve controls the positions of pistons *A* and *B*, and piston *A* in turn affects lever 11, through which it controls the carburetor throttle, while piston *B* through rod end 12 connects to an electrical rheostat inserted in the generator field, thereby controlling the load on the generator and engine.

Oil from the lubricating system of the engine is ad-



Arrangement of governor and hydraulic relay for Brill 660 and 860 engines

mitted at point 13 at all times. This oil under pressure tends to move piston *A* to its extreme left position, in which it is shown in the drawing; and piston *B* also to its extreme left position, while springs *C* and *D* tend to return both pistons to the right. However, the effect of the pressure oil on pistons *A* and *B* is subject to the control of the tubular valve 5. When piston *B* is in its extreme right position the generator applies the maximum load to the engine, while piston *A*, when in its extreme right position, holds the throttle closed.

Relay Valve Operation

Assuming that the engine is running under a condition that, even with the full generator load on it, its speed tends to become excessive, valve 5 moves to the right and oil under pressure escapes through port *E* to the gearcase of the engine. If, on the contrary, valve 5 travels to the left, indicating sub-normal speed, port *E* is closed, and the only possible path for the oil is through the tube and out through port *F*, into space *G*, behind the load-control piston. From there the oil can pass through a metering orifice 14 into a reservoir 15, whence it escapes through port *H* and returns through a pipe not shown to the crankcase.

Inlet 13 has a greater capacity than the metering opening 14, so that as long as port *F* registers with space *G*, piston *B* will continue to move to the left. On the other hand, if port *F* is far enough to the right so that it does not register with space *G*, spring *D* will return piston *B* to the right, owing to leakage through aperture 14. The hydraulic relay therefore amplifies the power of the governor to whatever extent is contemplated in the design, and causes pistons *A* and *B* to follow the governor movement, which is reproduced on an enlarged scale by the movement of tubular valve 5.

Starting from its extreme position to the right, which corresponds to closed throttle, the first 1 in. of movement of tubular valve 5 serves to open the carburetor throttle. After the throttle has reached its full-open position, piston *A*, which effects this opening, can travel no farther toward the left, and oil pressure is then applied to piston *B*, which has a range of travel of 2½ in. to the left, this travel being used to regulate the load on the generator and the engine. Thus it will be seen that within the capacity limit of the electrical equipment the engine works under full-open throttle and at its rated speed.

An additional function is performed by the electro-pneumatic valve *I*, which makes it possible to change the traction-motor connections from series to parallel without closing the throttle. When this change in connections is made the current draw from the generator is substantially doubled and its voltage substantially halved. This change-over occurs in a fraction of a second. To suit the new circuit conditions, the generator field strength must be suddenly weakened, as otherwise the engine would be over-loaded for a few seconds until the governor could make the necessary adjustments. To obtain this quick reduction in field strength, when the change-over is made, current is passed through the coil of unit *I* between terminals 16 and 17, which results in admitting compressed air through port *J* and closing the escape port *H*. The compressed air forces oil from reservoir 15 through check valve *K* into space *G*, with the result that piston *B* is forced to take up a position near the left hand limit of its travel. After the change-over is completed, the governor takes up its normal function again.

The above description covers the functions of the governor when it is desired to have the engine operate at its rated speed. If it is desired to run at less than rated speed and the control lever, therefore, is moved to a position corresponding to less than full load, lever 8 lessens the pressure on spring 6, thereby causing the governor to balance at the desired lower speed, and to function at that speed in the same manner as described in the foregoing. At the same time the hand lever is moved, the maximum opening of the carburetor throttle is limited, the throttle motion being measured by the motion of lever 11. In this way operation of the engine at wide-open throttle at reduced speeds is prevented. It is this combination of manual limit to the throttle opening, and governor regulation of the load and the throttle opening below this limit, which make possible the load characteristics shown by the curves published in connection with the description of the Model 860 engine in *Automotive Industries* of Oct. 26.

It will be readily seen that by the use of this combination it is possible to maintain whatever torque is desired when operating at any reduced speed. This prevents excessive fuel consumption, which results from operation at high speed under nearly closed throttle; also it prevents damage to the engine resulting from running under full throttle at materially reduced speed.

Interchangeability of Parts in Chilton Multi-Guide

WHEN the first issue of the Chilton Automotive Multi-Guide, the successor to the 22-year-old Chilton Catalog and Directory, appears in April, it will contain a copyrighted guide on the interchangeability of parts for some 375 models of over 100 passenger cars, and 12 unit assemblies for more than 5000 trucks built during the past five years.

This 300-page section makes available for the first time detailed information on the interchangeability for repair purposes of bearing, engine, rear axle, front axle, brake, clutch, generator, transmission, wheel, and universal joint assemblies; fenders, rims, headlamps, gas and radiator cap replacements, etc. This guide will include replacement parts sizes on selected items, with serial numbers, an orphan parts guide, body-make list and similar service information.

The Multi-Guide will contain about 450 pages of other information, including a classified buyers' guide, list of all manufacturers, trade name index, advertisements and advertisers' index, list of sales managers, advertising agencies specializing in automotive accounts, list of trade associations, historical and general automotive and aviation data, export statistics and merchandising and marketing data, compiled and presented in easy to read manner. The size of the type-page will be 7 in. x 10 in. instead of 5 in. x 8 in. as heretofore.

The publication will be issued in April and October of each year, and will have a total distribution of 50,000. These will go to all wholesalers, selected car dealers, repair shops, accessory stores, fleet operators, exporters and foreign dealers.

This is the first time any company or organization has attempted to supply this salient information in such an exhaustive manner. The interchangeability guide for parts and various automobile and truck assemblies will be the most complete reference ever published, and will give all necessary data to aid in maintenance of automobiles and trucks.

Conveyor Dipping Speeds Enameling In Fostoria Pressed Steel Plant

Installation for finishing replacement fenders gives better results than were obtained with hand dip method, as well as increasing output considerably.

IN order to expedite production and to obtain better results, the Fostoria Pressed Steel Co. of Fostoria, Ohio, recently had installed by Young Brothers Co. of Detroit, a complete system for enameling the replacement fenders for nearly all makes and models of cars which are made at the plant. With this system in operation, about 1200 fenders can be finished per 10-hour day and the resulting product is considerably improved over that obtained by the hand dipping methods employed previously.

After fenders leave the press shop, they are given a preliminary heat treatment preparatory to enameling in the furnace shown in Fig. 1. Fenders are subjected here to a temperature of 450 deg. Fahr. for about 30 min. in order to burn off all adhering oil and grease. This kiln type oven is gas-fired and has automatic temperature control.

Fig. 1—The entrance to enameling department of the Fostoria Pressed Steel Co., showing preheating oven at the right

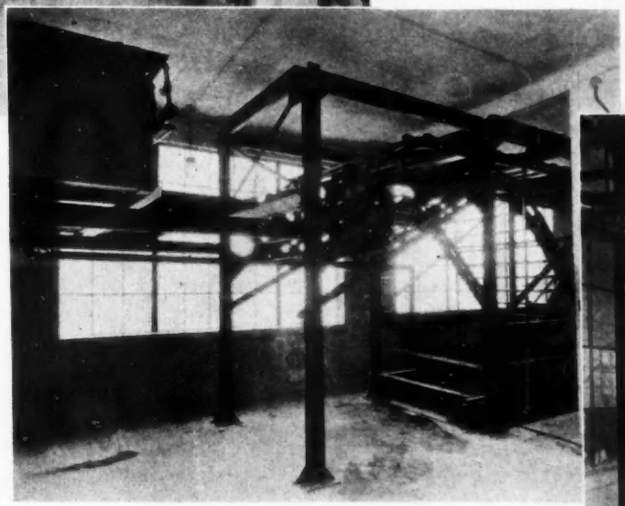


Fig. 2—To the right is a view of the loading end of conveyor, showing dip and straining tanks

Following the burn-off, the fenders are given a hand rub and then are blown off by a jet of compressed air. They are then taken to the enameling room, which is entirely separate from the rest of the plant. The equipment consists of a single compartment, continuous-conveyor enameling oven with automatic dip. The oven is 6 ft. 9 in. wide, 13 ft. 4 in. high inside and 106 ft. 5 in. long from center to center of sprockets. It is heated by a Remore gas heater. Fig. 2 shows the loading end of the conveyor with the dip tank and straining tank, while Fig. 3 shows the dip tank and drain board from a point at the entrance of the oven.

The dip tank is set in a pit with the surface of the enamel at about the floor level and it contains about 4000 gal. of enamel. As a precaution against fire, an additional tank is provided below the dip tank into which the latter can be dumped quickly. The underground storage tank is cylindrical and has a capacity of 500 gal. more than the dip tank.

The filter system consists of a straining tank equipped with removable fine wire mesh screen strainers. A motor-driven pump handles the circulation through a piping system which connects the drain board straining tank, the dip tank and the underground storage tank. The piping is so arranged that enamel that accumulates on the drain board may be elevated into the straining tank, and also so that the contents of the underground storage tank may be elevated into the dip tank.

The same pump is used to pump into the dip tank fresh supplies of enamel directly from the containers in which the enamel is received. The straining tank is arranged for adjustable gravity discharge

Fig. 3—Below is the dip tank and drain board from entrance of the oven

into the dip tank by means of a hand-controlled valve.

The dip tank, straining tank and drain board are piped for quick discharge into the underground storage tank in case of fire and the entire contents of the three containers can be emptied in three minutes. The quick opening valves controlling the quick discharge are held closed by fusible links and open automatically when the links fuse.

The entire installation is also protected by an automatic Foamite system so that in the case of a fire the contents are immediately dumped into the storage tank and Foamite applied to all exposed surfaces.

The oven room is under a controlled air supply which is thoroughly filtered through a chamber containing six air filters. The air supply is provided by a 24-in. impeller fan direct connected to a ½ hp. motor. About 3500 cu. ft. of air is supplied to the compartment housing the discharge end of the conveyor while the oven itself is under mechanical ventilation by means of a 35-in. fan exhausting through a stack.

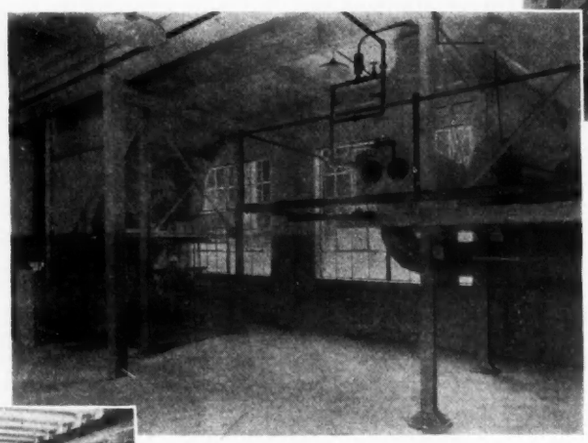


Fig. 5—The air filters as well as heating and ventilating equipment and Foamite fire engines are located near the high temperature oven

Fig. 4 — Below is the interior of the oven

The heater is of the remote gas type governed by a combination recording thermometer and automatic temperature controller operating through an electric relay on a gas valve. Hot air delivered by this heater can be varied in temperature from 590 to 760 deg. Fahr.

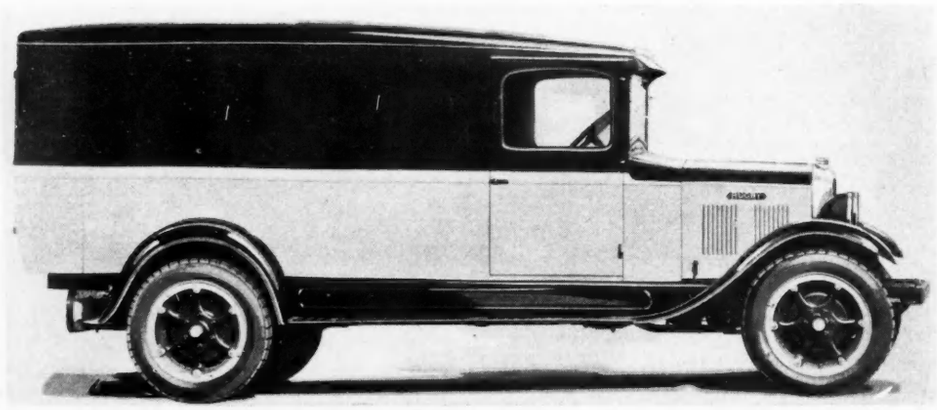
Fenders are carried through the oven suspended from the spacer pipes of a continuous double chain conveyor. The spacer pipes are set on 12-in. centers with the chains 6 ft. apart. The conveyor is driven from the head shaft through roller chains to a speed reducer and transmission by a 1 hp. 1200 r.p.m. motor. Although designed for a speed of 15 in. per min., it has been found possible to operate the conveyor at 26 in. per min., which, with two fenders per spacer pipe, gives a production of 1200 units per 10-hour day.

Fig. 6—The discharge end of the fender conveyor at the Fostoria plant

A complete circuit of the conveyor requires 65 min. with 40 min. of this time in the oven proper. The baking chamber is held at 450 deg. Fahr. and about 330,000 cu. ft. of 1100 B.t.u. natural gas is used per month.

An automatic kick-off stops the conveyor if a fender is allowed to remain on the conveyor after it passes the unloading point. When removed from the conveyors the finished fenders are placed on a specially designed double-deck wheel truck and are taken to the shipping department.

Rugby Panel Body



Rugby de luxe panel delivery car

A NEW de luxe panel body of attractive lines has been added to the Rugby truck series by Durant Motors, Inc. It is priced at $775 on the ½-ton, and at $1,160 for the 1-ton. Interior finish is in plywood paneling, screwed on rather than tacked. The driver's compartment is finished entirely in imitation leather. Any standard color combination is available at no additional charge. The accompanying photograph shows the model in contrasting colors.

Just Among Ourselves

The Events Leading Up to a Tragedy

OUR office wag suggests that business may go back to work—as it has been urged to do some 10,000 times in the last eight weeks—but that it may have a tough time heeding the admonition because it will have to spend at least a year answering the multitude of questionnaires about business conditions which it will find waiting for it. The successor to the flag-pole sitters and marathon dancers soon will be the man-who-has-not-investigated-business-conditions. "Business is sound" has practically become the theme song of the all-talkie in the cast of which practically every business man in the United States has participated since the late unpleasantness in Wall Street. We agree heartily with the sentiment expressed in that theme song, but we'll scream if anybody else announces it as though it were a new and marvelous personal discovery bursting for the first time on an unsuspecting world.

* * *

General Conferences Aid Stabilization

SERIOUSLY speaking, though, a great lot of good almost certainly is coming out of the various conferences, meetings and assembled whatnots in which business men have been participating. The direct psychological effect on the average member of the American public is good. He has been made to feel that the world isn't coming to an economic end, even if he did lose part of his shirt in speculation. His reaction from buying has been minimized without any doubt. The general effect is good.

Then, too, it seems to us, there has been an even more important, though less obvious, benefit derived from that fact that practically every prominent American business man by now has been put publicly on record as promising to hold to such policies during this time of stress as will tend to be for the general good.

The direct effect on maintenance of sound, fair business policies in a period when business is under stress will, we believe, turn out to have been a very potent factor in real, fundamental stabilization.

* * *

Sane Talking Makes Money

SOME cynics who have had long experience in hearing rumors about various things automotive have long since adopted the slogan of "Believe nothing that you hear and only part of what you see." That slogan is particularly worth applying these days. If rumors were true the automobile business would be in terrible condition today. Reports of cancellations of retail orders in many cases—when checked up—have revealed the fact that the number of reported cancellations was greater for 100 per cent than the total number of orders that the given dealer ever had on his books.

The reports of men laid off at factories in several instances which we have investigated were found invariably to have been exaggerated.

The pessimistic rumor-monger is an economic curse to any industry at a period such as the one which the industry is passing through at present. Restraint and precision in expression even in casual conversations by automotive men right now, well may mean thousands of dollars in the pocket of the industry, which otherwise might have been lost. Sane talking as well as sane thinking is a money-maker today.

* * *

The New Champion of Highway Construction

THE program of Federal aid for highway construction again has a positive champion in the White House. Mr. Coolidge, it will be remembered, was none too favorable to the Federal aid program, although activity along this line did proceed during his regime.

President Hoover's statement at the opening of Congress last week leaves no room for doubt about the attitude of the present executive on this matter of considerable moment to automotive men.

"Federal aid in the construction of the highway system in conjunction with the states," the President said, "has proved to be beneficial and stimulating. We must ultimately give consideration to the increase of our contribution to these systems, particularly with a view to stimulating the improvement of farm-to-market roads."

* * *

Increased Buying Power From Tax Reductions

IF the President's income tax reduction recommendations go through, the purchasing power of the people of this country will be so increased as to make possible the purchase of about 185,000 more automobiles than would have been possible in 1930 if the reduction were not to go into effect.

The actual sales of automobiles, of course, will not be increased by any such figure through the tax reduction, because a score of other industries will be competing strongly for their share of the unexpected dollars which will be left in the pocket of Mr. Public. The total reduction is expected to amount to about $160,000,000. The potential market for automobiles and other products will be increased by just that amount, because nobody was expecting to have these dollars up until a few weeks ago.

The proportion of these total dollars which find themselves into automotive pockets eventually will depend entirely on the selling activity of the automotive industry and its merchants as compared to that of merchants in other industries.
—N.G.S.

First with the News

Reliable, Accurate

News of the Industry

PAGE 878 VOLUME 61 *Philadelphia, Saturday, December 14, 1929* NUMBER 24

Executives Affirm That Next Year Holds Promise

PHILADELPHIA, Dec. 14—A continuation of the return to operating schedules by a number of factories following seasonal shut-down for inventory, and further widespread indication that next year holds forth good promise for the automobile industry were among the major developments in the automotive world during the past week. Although many financial men differ as to the time when demand for automobiles will probably begin its upward swing for next year, most automotive executives look for the coming of normal demand along about February or March of next year, as was indicated by John J. Raskob in his report last week at President Hoover's business conference held in Washington.

Some bankers have expressed the belief that the recent stock market situation would set back automotive business for at least six months, and some of them have even gone so far as to indicate that the last three months of 1930 would see the peak of demand for that year. Automotive executives, however, who have been studying the situation with extreme care, look for a return of normalcy early in the year and expect large buying to begin within the first three months of 1930.

As far as production is concerned, the current month will prove largely a "mark-time" period. It is doubtful whether this month's aggregate output by the factories of the United States and Canada will equal that of November, which has been estimated as 214,000 vehicles. Total production for the first 11 months of the year has been fixed at 5,480,582 units, as compared with 4,357,600 in the corresponding period last year. Thus, it follows that an output of 119,498 units during this month will bring the year's total to the figure of 5,600,000 which has been generally accepted as a conservative estimate. While an actual prediction is impossible at this moment, it appears likely that the total for this month will bring the figure for the year rather above that estimate.

Sales executives report that new car sales are continuing favorably for the season, and a number of factory officials have pointed out that their retail sales reports indicate that the new car market is by no means following the trend of the stock market. The opinion is gaining strength that the prospect for a strong selling season in 1930 is good. The belief is also general that factory and dealer will come to closer understanding of each other's problems during the coming year.

Cleveland Awarded 1930 Bennett Races

WASHINGTON, Dec. 11—To Cleveland has been awarded the 1930 James Gordon Bennett international balloon races, Captain Luke Christopher, secretary of the contest committee of the National Aeronautical Association, announced today. The race is expected to be held in October.

Baillet Elected to Head Overseas Automotive Men

NEW YORK, Dec. 12—At the annual meeting of the Overseas Automotive Club, which was held today, following a luncheon of the club at the Hotel Astor, P. F. Baillet, an exporter, was elected president. George Tiffany, of the Overseas Motor Service Corp., was elected first vice-president, and C. M. Peter, export manager of the Black & Decker Mfg. Co., was elected second vice-president.

Other officers elected were: Secretary, George E. Quisenberry, editor of *El Automovil Americano;* treasurer, R. C. Thompson, of the Prest-O-Lite Battery Sales Corp., and assistant secretary and assistant treasurer, Jay S. Tuthill, Business Publishers International Corp.

G.M. Transfers Caminez

DETROIT, Dec. 12—Harold Caminez, former chief motor engineer of the Allison Engineering Co., Indianapolis, and designer of the Caminez engine for airplanes, has been transferred by the General Motors Corp. and is now engineer in charge of the aircraft engine experimental division of Cadillac.

Pierce-Arrow Trucks Will Be Continued

Separate Unit to be Formed for all Truck Output, Says Erskine

BUFFALO, Dec. 11—A rumor that has been turning up during the last six months was interred once and for all here today when Pierce-Arrow distributors were informed by A. R. Erskine, chairman of the board of directors of the Pierce-Arrow Motor Car Co., that Pierce-Arrow would continue in the truck field and aim to attain a position more commanding than ever in the past.

In his remarks to distributors, Mr. Erskine declared that a separate truck unit of the Pierce-Arrow and Studebaker companies would be formed, and that the separate company would engage in the manufacture and distribution of Pierce-Arrow trucks.

This company will form the third unit of the Pierce-Arrow-Studebaker combination, and will operate along the independent line which now characterizes this group. Heretofore the truck business of the Pierce-Arrow Motor Car Co. has operated as a division of the general sales department under the direction of Hal T. Boulden, as manager of the commercial car division.

"A new and complete line of Pierce-Arrow motor trucks will be placed on the market shortly," Mr. Erskine said. "Our new line will embody the most advanced features of motor truck engineering. The men directing this work have had long and intimate knowledge of the motor truck business and its developments, and we believe the new Pierce-Arrow line will be distinctive in improvements and operating efficiency to meet completely present-day haulage requirements."

It was understood that the headquarters of the new truck company would be in Detroit, where one of the Studebaker plants has been made available because Studebaker has been concentrating its manufacturing at the South Bend plant.

While there was no express statement to this effect, a likelihood exists that Studebaker commercial cars will be included in the new truck unit yet to be formed.

Optimism is Seen by Automotive Men

Trade Associations Tell U. S. C. of C. Outlook is Satisfactory

WASHINGTON, Dec. 11—Supplementing published announcements reports on the status of the automotive and other industries, the Chamber of Commerce of the United States today released reports from the M.E.A., N.S.P.A., and the N.A.D.A. Following are the report of the associations as presented.

These followed the talks made at the conference by Alvan Macauley, president of the National Automobile Chamber of Commerce, and Frank A. Seiberling, president of the Rubber Manufacturers' Association. The reports made public today covered statements by J. R. Histed, vice-president of the National Automobile Dealers' Association; J. M. McComb of the Motor and Equipment Association; Charles J. Swain of the National Standard Parts Association, and Earl Turner of the Automobile Electric Association.

Motor Equipment and Parts—M.E.A.

The parts-accessory industry slowed up in October in line with the decline in car and truck production and this recession will continue throughout the rest of the year. Having enjoyed an unusually prosperous period during the first seven months of the year, the decline is not considered in an unsatisfactory light.

Automobile Parts—N.S.P.A.

It is our opinion that by the very nature of our association a perfectly normal increase in 1930 over the year of 1929 will be between 15 and 20 per cent. The last six months of 1928 and the year 1929 have been what we term "new car years," and as such, poor ones for the parts wholesaler. It is very evident that there are practically no replacements made in new cars under a period of 12 months. Therefore, in 1930 we expect to draw immediately upon those sold in the last six months of 1928, and consistently increase our business as those sold in 1929 approach the replacement age.

Automotive, Electric—A.E.A.

This specialized industry is supplementary to that of automobile manufacture and so far as sales to motor car manufacturers are concerned, that department of the business would be directly in proportion to the sales of finished motor cars. Consequently, any estimate of future conditions would parallel that of the motor car manufacturers.

So far as sales of maintenance items are concerned, the majority opinion is that sales of service material and service labor are likely to increase in the event that the sales of new motor cars should decline for a period longer than the usual recession at this season.

Automobile Dealers—N.A.D.A.

While all are looking forward to some curtailment of activity in 1930, such curtailment is a result of special conditions in the business rather than due to any fundamental weakness in the national industrial structure.

The most careful calculations made indicate that there is a basic production demand for probably 4,000,000 cars and trucks, of which 1,000,000 will be for export and 3,000,000 for the domestic market. We are not so optimistic as to declare that 3,000,000 actually will be built for the domestic market, because there still may be slight recessions due to the readjustments of other business to the national economic picture, but barring unexpected lapses, preliminary estimates are for that total.

We have now reached the stage where the maintenance of 25,000,000 vehicles on the road is a much larger economic consideration than the sale of any certain number of cars in any certain number of months. While the wholesale value of motor vehicles produced in any year may total the large sum of three billions of dollars, the after-market (service, parts, accessories and supplies) for vehicles already on the road will total probably $6,500,000,000.

The industry is facing the future with optimism, based upon a thorough knowledge of its possibilities as well as conditions of general business, and confident that inasmuch as 85 per cent of the use of a motor vehicle is for business purposes, no enduring apprehension need exist.

Captain Koehl Plans New Device Study

BERLIN, Dec. 12—Captain Herman Koehl, who with Col. James Fitzmaurice and Baron von Huenefeld, flew the monoplane "Bremen" across the Atlantic, expects to sail today for the United States, arriving Dec. 22 in New York. Captain Koehl intends to study new technical developments in aviation while he is in this country, and has expressed considerable interest in the work of the Daniel Guggenheim Fund for the Promotion of Aeronautics.

Sale of Fordsons Taken from Dealers

Agricultural Outlets Will Handle Tractors, But Service Set-up Remains

DETROIT, Dec. 12—A change in the method of distributing Fordson agricultural tractors in the United States was announced yesterday by the Ford Motor Co. The tractors will be sold to farmers exclusively through wholesalers and retailers of agricultural machinery. Tractor service will still be given by Ford dealers, however.

This policy has been adopted, Ford officials explained, because dealers are better equipped for repairs and service than the average implement dealer.

The announcement was authorized by Sir Percival Perry, London, under whose supervision the Fordson is being built at Cork, Ireland.

The improved tractor, according to the announcement, will develop 50 hp. at 1000 r.p.m., or 2¾ m.p.h. ploughing speed, an increase of about 27.5 per cent over former models.

Easier starting, it is claimed, will be possible with the use of a high tension magneto. A pump has been added to the cooling system. An enlarged air washer, a new lubricating system, stronger crankshaft and a redesigned transmission have been announced as improvements to the new model.

Italian Tariffs Changed

WASHINGTON, Dec. 11—Automobile motors and their parts, and brake and clutch linings containing asbestos, are among the products on which the Italian government on Dec. 8 increased tariff duties, according to a cablegram received by the Department of Commerce from commercial attache M. M. Mitchell, Rome. No change in duties on completed automobiles was made.

Ford Gets Columbia Gift

NEW YORK, Dec. 12—It was announced today that Columbia University recently presented the Edisonian Museum, established by Henry Ford near Detroit, 190 items of historical electrical apparatus. The gift was made by the department of electrical engineering of the university.

Financial Notes

Company	Remarks
Allis-Chalmers Mfg. Co.	quar. div. 75c. Stock now on $3 annual basis, instead of $2.
City Machine & Tool Co.	ex. div. 40c and reg. quar. div. 40c.
Comm. Credit Co.	net income 10 mos. end. Oct. 31, $6,168,976, compared with $3,812,018 for same period of 1928.
Hercules Motors Corp.	reg. quar. div. 45c.
Houdaille-Hershey Corp.	reg. quar. div. 62½c on Class A, and 50c on Class B.
Paramount Cab. Mfg. Co.	net profit for year end. Sept. 30, after all charges, $1,115,981, equals $4.46 a share on 250,000 np. com.
Perfect Circle Co.	reg. quar. div. 50c.
Pierce Governor	reg. quar. div. 37½c.
Seiberling Rubber Co.	passed common dividend, which was $1 for past several years.
Sterling Truck Co.	net earnings about double those for sale period 1928.
Thompson Products, Inc.	ex. quar. div. 30c, in addition to reg. quar. div.
Winton Engine Co.	net income after depr., taxes, etc., equal to $1.40 a share on common after preferred dividends.

Tentative Program Set For S.A.E. Annual Meeting

NEW YORK, Dec. 10—"What 1930 Offers to the Motor Industry," will be the subject of an address by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, to be given before the annual meeting of the Society of Automotive Engineers in Detroit, Jan. 20, according to the tentative program for the meeting, announced today. Mr. Reeves' address will be given at the general session which is to follow a short business session at the opening of the convention. The annual dinner of the Society, at which officers-elect will be installed, will be held at the Hotel Pennsylvania, New York, the evening of Jan. 9, according to the announcement.

Three papers will be read at the Research Session in Detroit: "The Properties of Gasoline With Reference to Vapor Lock," by O. C. Bridgeman, Bureau of Standards; "The Influence of Atmospheric Conditions on Knock Testing," by D. B. Brooks, Bureau of Standards, and "The Effect of Design on Engine Acceleration," by D. B. Brooks and C. S. Bruce, of the Bureau of Standards.

At the Detonation Session, J. M. Campbell, W. G. Lovell, and T. A. Boyd will present a paper on "The Detonation Characteristics of Some of the Fuels Suggested as Standards of Anti-Knock Quality," and Oliver Thornycroft will read a paper on "The Fundamentals of Detonation." Mr. Thornycroft is connected with Ricardo & Co., Ltd., of Sussex, England.

At the Aeronautic Session, Jan. 21, Ralph H. Upson, of the Aeromarine-Klemm Corp., will read a paper on "Flight Tests of the All-Metal Dirigible." At the Mixture Distribution Session, Alex Taub, Chevrolet Motor Co., will read a paper on "Mixture Distribution." "Cold Carburetion" will be the subject of a paper by Karl H. Kindl, of the Delco-Remy Corp., and E. H. Shepard, Holley Carbureter Co., will present a paper on "Downdraft Carburetion."

At the Engine Bearing Session, Louis Illmer, Brewer Titchener Corp., will present "High Pressure Bearing Research," and a representative of the Chrysler Corp. will discuss the application of the data.

At the Riding Qualities Session the "Elimination of Chassis Vibration" will be presented by Earl H. Smith of the Olds Motor Works, and "Riding Qualities" will be discussed by Dr. Fred A. Moss, of George Washington University.

At the Production Session, Wednesday evening, Jan. 22, Dean Dexter S. Kimball, Sibley College, Cornell University, will present a paper on the "Economics of Production."

O. D. Treiber, Treiber Diesel Engine Corp., will present a paper on "Light Weight Diesel Engines," at the Diesel Engine Session. J. Barraja Frauenfelder will present the "Question of Torsional Vibrations as Applied to Diesel and Other Internal-Combustion Engines and Method of Damping." Mr. Frauenfelder is connected with the Sun Shipbuilding and Drydock Co., Chester, Pa. "Diesel Engines" will be the title of a paper by J. E. Wild, Robert Bosch Magneto Co., Inc.

The Transportation Session, to which special attention is called in the announcement, will have a paper on "The Trend of Weight and Size in the Development of Motor Trucks and Motorcoaches," by Pierre Schon, General Motors Truck Co.

A body conference will be held Thursday afternoon, Jan. 23, and the body engineers are sponsoring a dinner and entertainment to be held the evening of the same day. At the Front Wheel Drive Session, William Muller, vice-president of New Era Motors, Inc., will present a paper on the "Front Wheel Drive." "The Work of the New Devices Committee of the General Motors Corp." will be presented by W. J. Davidson of the corporation, at the Inventions Session. Donald Campbell, of Campbell, Wyant & Cannon, will read a paper on the "Relation of Foundry Practice to Engineering."

Europe May Fight U.S. Car Imports

BRUSSELS, Dec. 9 (Special)—Representatives of nearly all European automobile makers met in a third secret executive session here today to further consider the problem of checking the rapidly increasing sales of American cars and trucks on this side of the Atlantic. It was learned that the only definite decision was to conduct an aggressive campaign in Europe urging the people to buy only home manufactured cars and trucks.

Ford Plant Contract Let

NEW YORK, Dec. 9—Contract for the erection of a Ford assembly plant at Edgewater, N. J., which will eventually replace the plant at present in operation at Kearny, N. J., which has been sold to the Westinghouse Electric Co., has been let to the Turner Construction Co. of New York. The main building of the Edgewater plant will cover 540,000 sq. ft. and will be supplemented by boiler room, oil house and dock covering in all 290,012 sq. ft. The plant will employ 7000 persons and will cost approximately $2,858,700. Work on an immense dock, which will have a total area of 276,000 sq. ft., 600 ft. long and 460 ft. wide, has been in progress since last summer.

Holzhauer is in Production

MILWAUKEE, Dec. 9—The Holzhauer Products Corp., recently organized to manufacture a patented electrical windshield heater, has established its plant and will commence to market the device on Dec. 15. Production is at the rate of 400 units a day. Alois Holzhauer, Sr., is president of the new company. Michael J. Holzhauer is vice-president; John M. Holzhauer, treasurer, and Alois Holzhauer, Jr., secretary.

Motor Wheel Adds to Unit

DETROIT, Dec. 9—The Motor Wheel Corp., of Lansing, has allotted an additional 12,000 sq. ft. of space in one of its plants for activities of the heater division. In two years since the company took over the Piatt Heater Co. it has brought out household heaters.

Motor Transport Reforms Before Hungarian House

BERLIN, Nov. 25 *(Special)*—Establishment of a centralized administration to deal with automotive vehicles operating as common carriers in Hungary, and the establishment of additional motor transport lines to supplement existing rail services, are among the motor transport reforms asked in a bill introduced in the Hungarian House of Deputies by the Minister of Commerce, Herr Budd.

The new bill is designed to improve traffic conditions in Hungary, and to coordinate the motor transport activities with other forms of public transportation, preventing unrestricted competition at a loss to individual carriers. Administration of the new measure would be entrusted to the Department of Commerce of Hungary.

Daimler May Merge

BERLIN, Nov. 25 *(Special)*—According to reports emanating from Austria, the Oesterreichische Creditanstalt, a bank, has requested the Austro-Daimler Company, which is controlled by a bankers' syndicate, to investigate the possibilities of a merger with the Steyr works. The latter is said to have suffered heavy losses recently, although a report is current that it is negotiating with Russia for the sales of 6000 automobiles.

Moving Parks Equipment

DETROIT, Dec. 9—Machinery and other facilities for production of Parks airplanes, by the Detroit Aircraft Corp. are now in process of removal from St. Louis to Detroit. About 100 men will be employed at the old Studebaker plant on Campau St., according to officials of the company, and two types of biplanes will be built, a training plane and a small sport model. The Parks aircraft school will remain at St. Louis, it is explained.

Martin-Parry Sells Portion

SPOKANE, Dec. 9—The Martin-Parry Corp. has disposed of its business in Washington and Oregon to Elliott Higgins of Seattle, manufacturer of school bus bodies. Warehouses in Portland, Seattle and Spokane are being taken over by Higgins. School bus bodies will be stocked or manufactured at these points.

American Industry Grows In European Branch Units

WASHINGTON, Dec. 8—The tendency of highly developed American industries, especially automotive, to establish branch factories in foreign countries, is discussed by Dr. Louis Domeratzky, Chief of the Bureau of Regional Information of the Department of Commerce.

"The important part played by American industry with its mass production methods during the war; the attempt of some of the more progressive countries of Europe, notably Germany, to catch up with the so-called 'rationalization' progress of the United States, and, finally, the aggressive expansion policy of some of our more important industries, particularly automotive, in the direction of foreign branch plants," Dr. Domeratzky said, "have served to attract the attention of the world to the achievements and implications of American industrial advance and have intensified the interest of the European countries in our industrial policy and methods.

"We may also assume that for some time to come the United States is likely to maintain its advanced position in the modern industrial world and that, as a consequence, it will possess the necessary initiative and financial strength to carry its industrial achievements into foreign countries in the absence of artificial restrictions. The direction of the movement and the extent to which it may be affected by certain developments tending toward closer international relations in the economic field are beyond our capacity to predict."

Toledo Steel to Expand

TOLEDO, Dec. 9—The Toledo Steel Products Co., makers of automobile valves, today announced a $200,000 expansion program to provide forging and heat-treating equipment for new heat-resisting alloy valves to be manufactured by the company. V. E. Crawford has resigned as manager of the Toledo plant, and E. R. Pillars, treasurer and manager of the Fostoria Screw Co., has been given charge of both plants. H. E. Bremforder has been made assistant secretary, treasurer and office manager of the Toledo company.

Alfred Lucking

DETROIT, Dec. 9—Alfred Lucking, aged 73 years, former counsel for Henry Ford, died at his home here recently, following a stroke of apoplexy. His law practice in Detroit, extending for nearly 50 years, led him into many trials that attracted national attention.

He was chief counsel for Henry Ford in the libel suit against the *Chicago Tribune* which was heard in 1919. He successfully defended the Ford Motor Co. in 1916 against the injunction sought by the Dodge brothers to compel the declaring of a dividend and prevent the building of the Rouge plant.

Arkansas Raises Motor Vehicle Tax

LITTLE ROCK, Dec. 12—Notice of increased rates for automobile license fees on all makes of cars weighing 3500 lb. or more, gross, was sent out just recently by Dwight H. Blackwood, state highway commissioner of Arkansas, to sheriffs and county tax collectors of the 75 counties. Licenses will be issued commencing Dec. 20. Only four makes of cars, Fords, Chevrolets, Pontiacs and Plymouths, will be exempt from the increased fees. Owners of the smaller cars will pay license fees at the rate of 12½ cents per hp. and 55 cents per 100 lb., the same as last year.

Yellow Buys Into Wills

MINNEAPOLIS, Dec. 10—Thirty per cent of the interest in C. H. Will Motors Corp. has been bought by the Yellow Coach & Truck Co. The corporation, which two years ago succeeded Wilcox Trux, Inc., assembles trucks and buses. Trucks range from 1½ to 5 tons. The corporation has branches in Oakland, Cal., where there is an assembly plant, St. Louis, Kansas City, Detroit, Pittsburgh, Cleveland and Cincinnati.

Hercules Gets Order

CANTON, Dec. 10 — The Amtorg Trading Corp. has recently placed its third order for Hercules engines with the Hercules Motor Corp., of Canton. The latest contract calls for delivery of 1000 WX and YX series heavy-duty, six-cylinder engines. The current order brings the total number of Hercules engines sold for use in Russia to over 3000 for the year.

Draws Starter Specifications

NEW YORK, Dec. 9—The Aeronautic Division of the S.A.E. Standards Committee has drawn up specifications for a starter mounting for small aircraft engines, with a bolt-circle diameter of 4 in. and a distance of 1 11/16 in. from the face of the mounting flange to the clutch jaws. Six studs with 5/16 by 24 U.S.F. threads are specified. The proposal will be circulated among aircraft engine manufacturers and the division will be guided by the comments received as to whether it will go ahead with it.

Chrysler Opens Salon

DETROIT, Dec. 12—Opening of a Chrysler Salon at Palm Beach, Fla., for the entire winter season, has been announced by the Chrysler Corp. W. F. Chamberlin of the factory is in charge of the exhibit.

Employees Get Insurance

NEW YORK, Dec. 9—Through revision and expansion of its group insurance program, more than $275,000 of life insurance now covers employees of the Young Radiator Co., Racine, Wis.

Chapin Appointed to Head Organizing Commission

WASHINGTON, Dec. 9—Secretary of State Stimson today announced the appointment of Roy D. Chapin, chairman of the board of the Hudson Motor Car Co., and chairman of the highway committee of the National Automobile Chamber of Commerce, as president of the American organizing commission in charge of the Sixth International Road Congress, to be held in Washington, Oct. 6-13, 1930.

Other members of the commission are: Wilbur J. Carr, Assistant Secretary of State; Robert P. Hooper, American Automobile Association; Henry G. Shirley, American Association of State Highway Officials; Charles M. Upham, American Road Builders' Association; A. J. Brosseau, vice-president of Mack Trucks, Inc.; H. H. Rice, vice-president, General Motors Corp., and a member of the Highway Education Board.

Diesel Trials Continued

WASHINGTON, Dec. 10—Since the first flight made on Oct. 4, 1929, in an airplane powered with the Diesel airplane engine "SL 1," manufactured by the Junkers Co., of Dessau, Germany, trial flights have been continued and now this motor has been in the air roughly 60 hours, which includes a flight from Dessau to Cologne and return, according to a report from assistant trade commissioner A. Douglas Cook, to the Department of Commerce.

Sales Schools Held

DETROIT, Dec. 11—Schools of salesmanship are being conducted in various parts of the country by the De Soto Motor Corp. While the schools are intended primarily for the benefit of those who desire to earn extra money by part-time sales work, they are being attended also by business men, professional automobile salesmen, and others who are desirous of broadening their business educations.

Buick Takes Over Distributor

DETROIT, Dec. 9—With the retirement of A. C. Randall, president of the Randall-Dodd Company, Buick distributors for the Salt Lake City section, that organization becomes a part of the Buick Motor Co., and will be known as the Salt Lake City Zone, according to an announcement made by C. W. Churchill, general sales manager.

Linde Opens Branch Plant

NEW YORK, Dec. 9—The Linde Air Products Co. announces the opening of an oxygen plant at Portland, Ore., on a private siding on the Oregon-Washington Railroad. A. D. Davis is superintendent of the Portland plant.

Detroit Aircraft Opens Office

DETROIT, Dec. 9—Detroit Aircraft Corp. has opened sales offices in the Roosevelt Bldg., Los Angeles, with James E. Appleby, who has been appointed West coast sales representative for the company, in charge.

Compulsion is Attacked in Insurance Programs

NEW YORK, Dec. 11—Financial responsibility laws rather than compulsory automobile insurance, will promote discipline among motorists and reduce the number of accidents on the highways of the country, speakers who addressed the fifteenth annual convention of the Insurance Federation of America yesterday in the Hotel Astor, believed.

State Senator Albert E. Lavery of Connecticut, in discussing the financial responsibility act of that state, asserted that a survey of all automobile accidents in Connecticut in 1928 showing that 79.5 per cent of them were traced to the drivers, "sustained the judgment of the legislature in placing the burden where it belongs—on the man who drives the car."

The financial responsibility law, he declared, is the leader of all similar legislation and as a "disciplinary plan" has shown that 85 per cent of all persons classified "supply the responsibility without question." The act, he said, has proved that it is not detrimental to guarantors and that it has secured a greater insurance coverage.

John W. Downs, manager of the Insurance Federation of Massachusetts, asserted that his state had made a mistake in enacting the compulsory insurance law there and that it would have to be repealed "before conditions on the highways improve." In the first year of operation of the law in 1927, he said, there were 25 per cent more persons injured by automobiles in the state than there were in the previous year.

Miller Sees a Million Drop in Car Production

CHICAGO, Dec. 12—Automobile production in the United States and Canada in 1930 should be at least 1,000,000 cars less than in 1929, in the opinion of Linwood A. Miller, president of the Willys-Overland Co., who was in Chicago yesterday to address a meeting of the company's dealers. Mr. Miller said that estimates of the output of automobiles next year range from 4,600,000 to 5,000,000 units, but he is inclined to believe that the lower figure will be established.

Such production would compare with an estimated outturn of 5,700,000 cars this year, the largest ever reported by the industry. The previous record year was 1928, when 4,601,130 units were produced. Notwithstanding this possible large curtailment of manufacture of new cars, Mr. Miller feels that the automobile industry next year will experience the best year in the history of the trade, basing his opinion on the fact that production will be on a conservative schedule laid out to keep within the retail demand.

Chrysler Trust Gets Shares

NEW YORK, Dec. 11—The Chrysler Corp. has authorized the purchase of 42,300 shares of its common stock for the Chrysler management trust and the employees' stock bonus plan. This purchase will increase the trust's holdings slightly more than 100,000 shares. About 90 key men of the Chrysler organization are participating in the management trust, and about 400 department heads participate in the stock bonus fund.

Macauley Named Member of Survey Board Group

WASHINGTON, Dec. 12 — Alvan Macauley, president of the National Automobile Chamber of Commerce, and of the Packard Motor Co., has been named as one of the 20 members of the executive committee authorized by the National Business Survey Conference. The committee was announced today by Julius Barnes, who will act as its chairman. A larger general committee, also authorized by the conference, and to be named later, will be broadly representative of the many lines of business enterprise and may consist of as many as fifty men. The individual members of the larger committee will serve as points of contact between the executive committee and trade associations and commercial groups.

No date has been set for the first meeting of the executive committee. The members will have before them within a short time analyses of the reports made to the conference, as well as other material which is being gathered on the business situation. It is hoped that at its first meeting the executive committee will be in a position, after going over the report, to recommend courses of action looking to continued stabilization of business.

In announcing the committee, Mr. Barnes said that a preliminary study of the reports made to the conference indicates that there is nothing to cause further timidity or hesitation, but, rather, warrants confidence in the early optimism in the early stabilization of business activity without justifying optimism before the close of the test period of the next few months.

Air Mail Poundage Gains

WASHINGTON, Dec. 12—Air mail figures just made public by the Post Office Department showed 623,161 lb. carried in the month of November, 78,464 lb. less than were carried in October, 1929, but a gain of 198,696 lb. over November of 1928.

Curtiss Sells to Amtorg

NEW YORK, Dec. 11—Curtiss Aeroplane Export Corp. has sold ten Conqueror engines and spare parts, valued at more than $100,000, to the Amtorg Trading Corp. for shipment early in 1930 to the Union of Socialistic Soviet Republics.

Slade Appoints Copeland

NEW YORK, Dec. 9—Harry J. Copeland has been appointed sales manager of the Slade Asbestos Corp., according to an announcement by the company. For the past 13 years Mr. Copeland has been director of purchases for the Federal Motor Truck Co.

Manufacturers Announce Show Week Activities

PHILADELPHIA, Dec. 12—Several automobile companies have announced inter-organization events in connection with the New York and Chicago National Automobile Shows to be held Jan. 4-11, and Jan. 25-Feb. 1, respectively. The list of such events announced to date is printed herewith, and will be repeated in its entirety, with subsequent additions, in *Automotive Industries* for Dec. 28, the issue preceding the National Automobile Show in New York, at the Grand Central Palace.

New York Show Week Events

Jan. 9—Durant Motors, Inc.—Luncheon—12:30 P.M.—Roosevelt.
Jan. 8—Marmon Motor Co.—Luncheon—12:00 Noon—Commodore.
Jan. 6—Franklin Auto. Co.—Luncheon—12:30 P.M.—Commodore.
Jan. 8 — Nash Motors — Luncheon — 12:00 Noon—Penna. Hotel.
Jan. 6-7-8-9—Hupp Motor Co.—Luncheon—1:00 P.M.—Commodore.
Jan. 7—Auburn Auto. Co. — Luncheon — 12:00 Noon—Commodore.
Jan. 4—Studebaker Corp. — Banquet — Commodore.

Chicago Show Week Events

Jan. 29—Durant Motors, Inc.—Luncheon—12:30 P.M.—Palmer House.
Jan. 30—Marmon Motor Car Co.—Luncheon 12:00 Noon—Palmer House.
Jan. 29—Franklin Automobile Co.—Luncheon—12:30 P.M.—Blackstone.
Jan. 28—Nash Motors — Luncheon — 12:00 Noon—Congress.
Jan. 27-28-29-30—Hupp Motor Co.—Luncheon—1:00 P.M.—Hotel Stevens.
Jan. 28—Auburn Auto. Co. — Luncheon — 12:00 Noon—Hotel Stevens.
Jan. 27—Studebaker Corp. — Banquet — Palmer House.

Ford Official Disclaims Knowledge of Litigation

DETROIT, Dec. 11—The Ford Motor Car Co. disclaimed any knowledge of suits reported pending by the Junkers Airplane Co. of Germany, charging patent infringements in the construction of the Ford all-metal planes.

According to a news service, a test suit will be started in Spain, where a large number of Ford planes have been imported.

"It is the first we have heard of it," a Ford official said here. "Presumably, any defense which we will be called upon to make will be set up through our Barcelona branch."

Maurice A. Oudin

SCHENECTADY, Dec. 9—Maurice A. Oudin, 63, vice-president of the International General Electric Co., died at his home in Schenectady on the night of Dec. 4, following an illness of pneumonia.

Lockheed Appoints Barber

LOS ANGELES, Dec. 11—Carl B. Squier, general manager of the Lockheed Division of Detroit Aircraft Corp., has announced the appointment of E. G. Barber, Jr., as sales representative in the Los Angeles district.

Buick and Marquette Price Raises Announced

DETROIT, Dec. 9—Increase in prices of Buick and Marquette automobiles, ranging from $25 to $75, has been announced by E. T. Strong, president of the Buick Motor Co. In most cases the new prices are a return to about the 1929 price level, although on some models the new prices are still somewhat below the 1929 list. It is stated that the increases are necessary to conform with the increased cost of production of the 1930 line.

	Old Price	New Price
Marquette		
Sport Roadster	$995	$1,020
Touring	995	1,020
Sport Coupe	995	1,020
Business Coupe	965	990
2-Door Sedan	975	1,000
4-Door Sedan	1,035	1,060
Buick 40		
Sport Roadster	1,275	1,310
Phaeton	1,275	1,310
Business Coupe	1,225	1,260
2-Door Sedan	1,235	1,270
Spec. Coupe	1,265	1,300
4-Door Sedan	1,295	1,330
Buick 50		
Coupe	1,465	1,510
Sedan	1,495	1,540
Buick 60		
Phaeton	1,525	1,595
Coupe (Country Club)	1,625	1,695
5-Pas. Coupe	1,675	1,740
5-Pas. Sedan (Brougham)	1,695	1,760
7-Pas. Sedan	1,845	1,910
Limousine	1,995	2,070

Approves 9 Plane Models

WASHINGTON, Dec. 10—Nine new airplane models have received approved type certificates by the Department of Commerce, an announcement today said, bringing the total of airplane models thus approved to 271. The new models and power plants are:

Mohawk two-place open land monoplane, Kinner 90 horsepower motor.

St. Louis Cardinal two-place open land monoplane, LeBlond 90 horsepower motor.

Paramount Cabin air four-place cabin land biplane, Wright 165 horsepower motor.

Curtiss Fledgling two-place open land biplane, Wright 165 horsepower motor.

Verville four-place cabin and monoplane, Wright 225 horsepower motor.

Curtiss-Robertson Robin three-place land monoplane, Warner 110 horespower motor.

Curtiss Fledgling two-place open land biplane, Wright 225 horsepower motor.

Curtiss-Robertson Robin four-place cabin land monoplane, Challenger 170 horsepower motor.

Bach ten-place cabin land monoplane, two Wright 225 horsepower engines and one Pratt & Whitney 450 horsepower motor.

Borg-Warner Filling Order

CHICAGO, Dec. 12—The Borg-Warner Corp. has started deliveries on the contract calling for 2500 transmissions a month for Canadian branch of one of largest American automobile manufacturers. This is in addition to daily deliveries of 100 to 1400 transmissions being manufactured for same company's assembly plant in United States. Detroit Gear & Machine Co., and Warner Gear Co., both Borg-Warner subsidiaries, are filling these orders.

Brown Appoints Nichols

PHILADELPHIA, Dec. 12—E. B. Nichols, former chief engineer of the Victor Talking Machine Co., and recently associated with the Bell Telephone Laboratories, has been appointed chief engineer of the Brown Instrument Co., according to an announcement made here today.

Donner-Witherow Merger Approved by Stockholders

BUFFALO, Dec. 12 — Stockholders of the Donner Steel Co. authorized yesterday the consummation of the merger of the Donner Steel Co., Buffalo, and the Witherow Steel Corp. of Pittsburgh. The change in capital structure necessary to the transaction was also approved. The stockholders of the Witherow concern had previously authorized the merger by a deposit of stock.

The Donner Steel Co. will authorize and issue $5,022,000 shares of new 6 per cent preferred stock and the common stock will be increased from 570,000 shares to 830,220 shares. The merger will be carried out through an exchange of stock between the companies and no cash is involved.

Vance Talks to S.A.E.

DETROIT, Dec. 11 — H. S. Vance, vice-president in charge of manufacturing of the Studebaker Corp., addressed the Detroit Section of the Society of Automotive Engineers Monday night, the subject being "The Importance of the Commercial Instinct in Automobile Engineering."

Mr. Vance emphasized the fact that engineers are often inclined to attach too much importance to the actual selling value of mechanical features, and that the cost of many changes in automobile construction is not commensurate with the effect they have on the buying public.

Parts Company Chartered

CLEVELAND, Dec. 10—Papers have been filed with the secretary of state chartering the Circo Products Co., with a capital of 1000 shares of no par stock for the purpose of manufacturing and distributing automotive parts, equipment and accessories, and to make a line of shop equipment. Incorporators are Charles M. Buss, Charles A. Neiman and A. M. Rogers.

Prices of New Erskine Announced by Studebaker

SOUTH BEND, Dec. 11—Details of the new Studebaker product to be known as the "Dynamic Erskine" which, it was announced in *Automotive Industries* last week, will be shown at the New York National Show for the first time, have been issued by the Studebaker Corp. The wheelbase of the new car will be 114 in., and the engine will be entirely new and of Studebaker design, according to the announcement.

Prices will be as follows:

Club Sedan	$895
Coupe (2 pass.)	895
Coupe (4 pass.)	945
Sedan	965
Tourer	965
Tourer (Regal)	1,065
Sedan (Regal)	1,065
Landau (Regal)	1,095

Regal models include six wire wheels and a luggage grid. Wood wheels are standard on all other models.

To Have 250 Exhibits

NEW YORK, Dec. 11—The International Aircraft Exposition to be held by the Aeronautical Chamber of Commerce of America, Inc., in St. Louis, Feb. 15 to 23, will house 250 exhibits of aircraft engines and accessories. This exhibit will be held in the St. Louis Arena, large enough to show even the largest planes entered in the exposition. Several foreign exhibitors have signified their intention of shipping planes. Charles L. Lawrance, president of the Curtiss-Wright Corp., is chairman of the show committee of the Aeronautical Chamber of Commerce sponsoring this exposition.

Pharis Tire Gets Large Order

NEWARK, OHIO, Dec. 10—The Pharis Tire and Rubber Co. has received orders for tires and tubes from one of the largest retail distributors in the country which amounts to upwards of $3,500,000. The company will start production on this order during the first week in January. The company, during the past year has increased its output of tires from 2500 to 5300 daily and tubes are now being produced at the rate of 5000 daily.

Factory Production Reports

	November, 1929	October 1929	November, 1928	11 Mos. 1929	11 Mos. 1928	Total 1928
Auburn	450	1,232	....	22,851	11,810	12,899
Hupp (shipments)	2,294	5,654	3,114	....	....	....
Graham-Paige*	....	....	....	76,425	73,194	13,195
Nash	....	....	....	117,300	137,600	....
Gardner	210	250	....	3,520	....	3,609
Chrysler† (shipments)	16,440	....	....	....	....	....
Buick	....	20,582	....	....	....	....
Cadillac-LaSalle	....	5,150	....	....	....	....
Chevrolet	....	85,891	....	....	....	....
Franklin	....	800	....	....	....	7,769
Oldsmobile	....	4,994	....	....	....	86,000

* Export shipments, excl. Canada, 10,154 cars for first 11 mos., gain of 66% over first 11 mos. 1928.

† Dodge 4772; Chrysler 66, 70, 77 4108; De Soto 2860; Plymouth 2416; Dodge Commercial 1986; Fargo 298.

Steel Mills Have Passed the Recent Demand Slump

NEW YORK, Dec. 12—Indications are cropping out that the bottom in steel demand has been passed. The improvement is very slight so far. While a few rolling mills have been able to add moderately to their operating schedules, others continue along lines but little different from last week's zero state of order books. There are, however, more inquiries in the market and there is no question that automotive consumers are beginning to think of their first-half of January steel requirements.

It is generally expected that the 1930 market will be slow getting under way, and no one will be disappointed in initial orders being light. Mills are apportioning operations so that all workers share in the payroll. This means that with barely enough work for one shift, this is distributed over what in normally busy periods frequently are three eight-hour shifts of operatives. Even at that, quite a few mills would be money in pocket if they shut down, and it is chiefly to give their employees an opportunity to earn a little rather than nothing at all that a number of mills are being kept running. Body builders continue to call for small lots of full-finished automobile sheets.

Blue annealed sheets are also in moderate demand, with mills rolling by the continuous process competing keenly with the product of the standard jobbing mills in some widths. Inquiry for fender stock and other descriptions of strip-steel continues light. All steel producers are in a receptive mood with reference to first quarter business on the basis of prevailing prices and so far buyers show little disposition to question these. What will happen when tonnage business is ready to be placed remains to be seen.

Pig Iron—Middle West automotive foundries are taking more iron than they did last month. The market is holding steady with the Michigan price $19.50 @ $20 for foundry and malleable. The Valley market is unchanged at $18.50 for foundry and $19 for malleable. A few melters are said to be holding off placing their first quarter commitments in the expectation of a possible easing off in prices, but so far the market is quite steady.

Aluminum—While the sole domestic producer's quotations for virgin metal continue unchanged, the secondary market is softer, due to scrap accumulating at a greater rate than demand for remelted metal. Secondary No. 12 alloy is offered at as low as 16 cents in carload lots, with single ton lots quoted at 17 cents.

Copper—According to Wall Street information, output has been so sharply curtailed that it will be possible to maintain the pegged price of 18 cents, delivered Connecticut. In the "outside" market, however, electrolytic continues to be offered at concessions from that level without buyers being eager to take on metal.

Tin—Virtually no change has taken place in the price situation. The market is very quiet.

Lead—Storage battery demand for lead is maintained at a high rate in spite of the light inquiry from other consumers. The market is steady and quiet.

Zinc—Denials were issued here regarding the press cables that the international zinc cartel had collapsed. The committee, it was said in the New York market, is still at work. Prices are unchanged.

Bucking Traffic Is Trespass, Court Says

BOSTON, Dec. 12—According to a decision of the full bench of the Massachusetts Supreme Court a person operating an automobile in the wrong direction on a one-way street is a trespasser and is not entitled to the protection afforded by law, nor is a passenger in that machine.

Contracts Are Let for Austin Car Equipment

PITTSBURGH, Dec. 12—Contracts have been let to the Tillotson Mfg. Co., and the Spicer Mfg. Corp., for furnishing component parts of the American Austin automobile, and officials of the American Austin Car Co. were in Detroit last week to select a body for the new light car, according to announcements made here. As announced in *Automotive Industries* last week, the Electric Auto-Lite Co., Toledo, has received the contract for lighting and ignition equipment.

Present plans of the American Austin company call for the production of the first complete car some time during February. Four to five hundred workers will be employed in commencing operations, and it is hoped to have an assembly line in operation by March, eventually reaching a production of 500 cars a day.

Some of the machinery required for production has been purchased, and will be shortly installed in the Butler, Pa., plant which was purchased by the American Austin company from the Standard Steel Car Co. To date, the plant has been cleaned, and a heating plant has been installed.

The complete list of officers of the American Austin Car Co. is now as follows: President, A. J. Brandt, Detroit; vice-president, Samuel H. Vallance; secretary and treasurer, T. P. White, New York. In addition to the officers, the directorate includes Alexander S. White, New York; Horace S. Edwards, Pittsburgh; Frank Bulkley, Sir Herbert Austin, Birmingham, England, and Elias Ritts, Butler, Pa.

Salon is Successful

NEW YORK, Dec. 7—Actual sales of automobiles and custom coachwork at the silver anniversary Automobile Salon, which ended here tonight, far exceeded the expectations of the exhibitors, according to officials of the Salon. The number of paid admissions was larger than previous years, and individual exhibitors reported good sales.

Lansing Papers Report Reuter to Get Opel Post

DETROIT, Dec. 11—The local press of Lansing, Mich., reported this week that I. J. Reuter, president and general manager of the Olds Motor Works, would leave Lansing shortly after Christmas and would sail for Europe from New York City on Dec. 28. The news item indicated that Mr. Reuter was leaving to assume the duties of his reported appointment as managing director of the Opel Motor Works. At the Office of Mr. Reuter today, however, it was stated definitely that probably no authorized statement would be issued until early next week.

While it has been variously mentioned in the daily press that Mr. Reuter has been appointed to the Opel post no official confirmation has been made up to this moment either at Lansing or at the offices of the General Motors Corp.

Service School Travels

SOUTH BEND, Dec. 12—Studebaker dealers and their mechanics are being given a course in automobile construction and repair work in their own service stations by a trained factory crew touring the country in two service-school buses recently put into operation by the Studebaker Corp. The traveling school idea is part of a program to establish closer contact between the factory and dealers in respect to service problems. The buses are equipped with a complete set of tools and parts necessary to demonstration.

Urge South American Road

WASHINGTON, Dec. 11—A Pan-American conference to discuss the construction of an inter-American highway is proposed in a resolution introduced in the House Dec. 5 by Representative McLeod (Rep.), of Detroit, Mich.

The resolution directs the President to invite all the American governments to name an engineer and an economist to represent them at the parley, which would be held in Washington.

Thompson Opens Office

CLEVELAND, Dec. 9—General sales offices, through which all business is to be transacted between the central organization and Canadian and British distributors, were opened last week at 136½ St. Paul St., W., St. Catherines, Ont., it was announced here today by C. E. Thompson, president of Thompson Products, Inc., with offices in Cleveland and Detroit.

Indiana Tax Increases

INDIANAPOLIS, Dec. 10—Gasoline tax collections last month for the state of Indiana were $1,606,691.59, according to a report made public by Leland K. Fishback, gasoline tax collector. Collections for the same month a year ago were $1,062,948.07. The increase over the year amounted to 51 per cent.

Automotive Construction in 1930 Will Be Active

PHILADELPHIA, Dec. 12 — Announcements of construction in the automotive field for January and February, 1930, indicate an active building period for the first of the year. Work on the proposed Ford assembly plant at Edgewater, N. J., to replace the Kearney, N. J., property, will soon begin. Among other large projects announced this week were:

M. Arthur Wolf, Newark architect, will ask bids in January for $140,000 service and repair garage.

Martin Trailer Co., Westfield, Mass., plans to build manufacturing addition to cost about $75,000.

G. & O. Mfg. Co., New Haven, Conn., to begin construction of $75,000 addition for manufacturing automobile radiators.

Washington Air Terminals Corp., Washington, D. C., planning $100,000 hangar and reconditioning shop construction. Lockwood Green Engineering, Inc., engineers.

United States Rubber Co., Detroit, plans to spend $200,000 for additional tire manufacturing facilities. Headquarters, New York.

Century Boat Co., Manistee, Mich., has been purchased by John A. Hacker, Detroit. Proposed factory additions total $300,000.

Blaw-Knox Co., Blawnox, Pa., plans spending $250,000 on automotive parts manufacturing plant.

Grant Storage Battery Co., Minneapolis, awarded general contract to August Cederstrand for $100,000 storage battery plant addition, including equipment.

Charles A. Olson & Son, Inc., Minneapolis, has asked bids on two-story automobile body plant factory addition, to cost about $50,000.

Young Radiator Co., Racine, Wis., automobile radiators and heaters, planning to double manufacturing capacity.

Litigation Ended by Bosch Magneto

NEW YORK, Dec. 10—The settlement of a long-standing controversy between the American Bosch Magneto Corp. and the Robert Bosch Magneto Co., Inc., was announced yesterday.

The American Bosch concern will have the sole right to the use of the trade-mark "Bosch" in the United States, Canada, Mexico, Cuba and American dependencies. The Robert Bosch interests may use the words "Robert Bosch" in this territory.

Dayton Rubber Co., Dayton, Ohio, planning expenditure of $1,000,000 on Los Angeles tire manufacturing plant. Purchase of site expected soon.

Pritchett-Thomas Co., Nashville, beginning construction on $400,000 service and repair garage.

Firestone Tire & Rubber Co., Akron, has authorized $2,500,000 improvements and additions to tire manufacturing plant at Los Angeles.

Haynes Stellite Co., Kokomo, Ind., has awarded contract to L. P. Hutto for $50,000 foundry for automotive parts.

Auburn Automobile Co., Auburn, Ind., has authorized expenditure of $3,500,000 for additional automobile production facilities. Output to be increased 50 per cent, it is reported.

W. Howie Muir

DETROIT, Dec. 9—W. Howie Muir, 62 years old, founder of Jenks and Muir Manufacturing Co., in recent years makers of automobile springs and cushions, died last week in the Detroit Diagnostic Hospital of pneumonia.

New Central Offices of Chevrolet

Nearly 70,000 sq. ft. of floor space in the General Motors Annex have been taken over by the Chevrolet Motor Co. during recent expansion

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries.

NEW YORK, Dec. 12—Retail trade last week improved greatly under the impetus of more seasonable weather and was better than that a year ago. However, wholesale and jobbing trade was slow, for there seems to be a tendency on the part of merchants to proceed cautiously in making commitments. Steel production as a whole is from 60 to 70 per cent of capacity.

Earnings of 220 industrial and mercantile companies during the third quarter of the current year were 17 per cent above those in the corresponding quarter last year, according to the Federal Reserve Bank of New York.

COMMERCIAL FAILURES

Commercial failures during November, according to R. G. Dun & Co., totaled 1796, as against 1822 the preceding month and 1838 a year ago. Liabilities involved in the November failures amounted to $52,045,863 as against $31,313,581 in the preceding month and $40,601,435 a year ago.

FREIGHT CAR LOADINGS

Railway freight loadings for the week ended Nov. 23 totaled 950,280 cars, which marks a decline of 78,957 cars below those in the corresponding week last year but an increase of 109,638 cars above those in the corresponding week two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Dec. 7 stood at 92.7, as against 92.3 the week before and 92.2 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Dec. 4 were 7 per cent below those in the corresponding week last year.

CRUDE OIL PRODUCTION

Average daily crude oil production during the week ended Nov. 30 is estimated at 2,638,200 bbl., as compared with 2,633,250 bbl. during the preceding week and 2,506,150 bbl. a year ago.

BROKERS' LOANS

Brokers' loans in New York City during the week ended Dec. 4 declined $58,000,000, reducing the total to $3,392,000,000, as compared with $6,804,000,000 a year ago.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Dec. 4 showed increases of $29,000,000 in holdings of Government securities and of $25,400,000 in member bank reserve deposits, while there was a decrease of $40,000,000 in holdings of discounted bills. The reserve ratio on Dec. 4 was 71.5 per cent, as against 71.8 per cent a week earlier and 71.2 per cent two weeks earlier.

Men of the Industry and What They Are Doing

Loening Leaves Keystone

Grover Loening, founder, with his brother, of the Loening Aeronautical Engineering Corp., which was merged with the Keystone Aircraft Corp., has resigned as consulting engineer and director of the latter, and director of the Curtiss-Wright Corp., to engage in independent experimental work. Mr. Loening has organized the Grover Loening Co., with a capitalization of $1,000,000, of which he is president and chief engineer. Work is to be centered on several new developments in the aircraft field, among which is said to be a monowheel development for amphibion planes.

Curtiss Appoints White

The Curtiss Aeroplane & Motor Co. has appointed Henry J. White, well-known test pilot, to its sales staff at Garden City, L. I. He has been at different times test pilot and sales manager for the Sikorsky Mfg. Co., and pilot for the Willson Flying Corp., and has been connected with other companies in various capacities.

Plymouth Appoints Walker

Robert J. Walker has been appointed assistant director of advertising of the Plymouth Motor Corp., according to announcement by A. van Der Zee, general sales manager.

Advanced to Chairman

W. Ledyard Mitchell

whose appointment as chairman of the board of the Chrysler Export Corp. has been announced by the Chrysler Corp.

Chrysler Export Advances Mitchell and Briggs

DETROIT, Dec. 9 — The appointments of W. Ledyard Mitchell as chairman of the board of the Chrysler Export Corp. and of S. D. Briggs as vice-president of the export company have been announced at the general offices of Chrysler Motors and of the Chrysler Export Corp. respectively.

Mr. Mitchell, after extended experience in plant and operating management, assumed his first major responsibility in the automotive industry when he was named president of the Maxwell Motor Co. in 1917. After the reorganization of that company under Chrysler management, Mr. Mitchell was appointed vice-president in charge of manufacturing of the newly organized Chrysler Corp. In 1926 he became vice-president and general manager of operations for Chrysler, a position he held until illness forced him to take a leave of absence in December, 1928.

Mr. Briggs for the past five years has been European director of Chrysler sales and has been largely responsible for the development of the business of Chrysler Motors in Europe. He was appointed Chicago district supervisor of the Maxwell Motor Co. in 1922. With the inauguration of Chrysler management he was appointed a director of sales for the United States, a position he held until October, 1924, when he went to Europe to develop Chrysler business. Mr. Briggs will leave shortly for Europe, where he will continue to supervise the operations of the Chrysler Export Corp.

McCracken Gets Posts

WASHINGTON, Dec. 9—William P. McCracken, former assistant secretary of commerce for Aeronautics, has been appointed chairman of the board of the New York, Rio and Buenos Aires air transport line, and the post of special counsel for both the Goodyear Zeppelin Corp. and the Western Air Express. In making his announcement here last week, Mr. McCracken indicated that he would engage in a general law practice in New York and Washington, but that because of his interest in aeronautics, most of his activity would be devoted to the development of air transport.

Ludwin Sails South

L. Ludwin, director of the Foreign Department of Great Lakes Aircraft Corp., accompanied by his assistant, **F. Salles de Lorena**, and **Pilot George Gjoerloff** of the American Aeronautical Corp., sailed last week for South America, where they will engage in an airplane sales tour of South America, visiting several countries.

Export Executives Move

Among recent movements of General Motors Export Co.'s executives was the arrival on Dec. 3 of **H. J. Goetsch**, sales manager of General Motors South Africa, to attend the sales development conference now in session at the home office. **Frank Doubet**, recently appointed assistant sales manager of General Motors Nordiska, Stockholm, sailed Dec. 7 to assume his duties. **C. T. Coleman**, manager of the Truck and Bus Division of General Motors Export Co., who has been on a visit to European assembly plants, returned Dec. 10.

Beardslee Joins Durite

K. R. Beardslee, for ten years associate purchasing agent of Mack Trucks, Inc., located at the International Motor Co.'s plant in New Brunswick, N. J., has become associated with F. E. Koebel in the Durite Products Corp. and the Koebel-Wagner Diamond Corp. Mr. Beardslee will be located in Newark, N. J.

Whelan Goes to Far East

H. V. Whelan, export representative of the Hudson Motor Car Co., left Nov. 28 for a two-year tour of the Far East. Headquarters will be established in Singapore, from which point Mr. Whelan will visit distributors and also establish new sales outlets in ten foreign countries.

Made Vice-President

S. D. Briggs

whose appointment as vice-president of the Chrysler Export Corp. has been announced by the Chrysler Corp.

Men of the Industry and What They Are Doing

Carlton E. Worfolk has joined the advertising division of Durant Motors, Inc., and will be in charge of sales ammunition service to dealers, according to an announcement by Bryan Warman, advertising manager for Durant. Until recently Mr. Worfolk was an advertising account executive with a nationally known agency, where he was responsible for sales promotion activities for Dodge Bros. cars.

L. A. McQueen has been appointed manager of trade sales for the General Tire & Rubber Co., according to an announcement made by W. O'Neil, president of the General company. Mr. McQueen has already entered upon his new duties. Mr. McQueen has been successively assistant advertising manager, advertising manager and general manager of tire sales for the B. F. Goodrich Co., from which he resigned in October, 1929.

Mickelson is Promoted

Walter Mickelson, factory manager of the Kempsmith Mfg. Co., Milwaukee, milling machines, has been promoted to be manager of the Cleveland branch. He is succeeded by **H. L. Livesay**, who in turn is succeeded as production manager by **Gerald G. Telliger**, formerly superintendent of the Evinrude Motor Co., Milwaukee.

Zerbi Sailing for U. S.

Engineer Zerbi, chief of the technical and experimental staff of the Fiat Co. of Turin, will sail on the S.S. Berengaria, Dec. 24, for a six weeks' visit to the United States and in order to attend the New York show.

Mathis Arrives for Show

E. E. C. Mathis, president of the Mathis Automobile Company of Strasbourg, France, arrived in the United States on the Ile de France, Dec. 3. Mr. Mathis will remain in America for the New York show.

Newton Sails for Europe

Richard L. Newton, chief tool designer of the Cadillac Motor Car Co., sailed last week on the S. S. Ile de France, for Europe.

Mooney Sees Export Gain

NEW YORK, Dec. 9 — American manufacturers will sell approximately 100,000 more automobiles abroad this year than last, according to James D. Mooney, president of General Motors Export Co., on the eve of his departure for a trip to the Far East Dec. 6.

"The general world financial position is healthy," said Mr. Mooney, "one of the best indications of sanity and health being a noticeable retardation the last quarter of 1929 in the demand for passenger automobiles. I say this is healthy because I believe that the world has absorbed passenger cars at a little too rapid rate in recent years and has shown a wholesome willingness to catch up with itself before moving forward with renewed vigor."

Reed Returns From Europe

Herbert Reed, secretary and treasurer of the Fokker Aircraft Corp. of America, returned recently on the S. S. Leviathan from a trip to Europe. He was accompanied by Mrs. Reed.

Clore Succeeds Lawrence

Ralph H. Clore is the new general sales manager of the United States Electrical Tool Company of Cincinnati, succeeding George M. Lawrence, who resigned to become vice-president of the General Radial Drill Company. Mr. Clore formerly served as branch sales manager for the company.

Sergeson Presents Paper

R. Sergeson, metallurgist of the Central Alloy Steel Corp., Massillon, Ohio, was the guest speaker at the monthly dinner meeting of the Milwaukee Section, S. A. E., at the Milwaukee Athletic Club on Wednesday evening, Dec. 4. Mr. Sergeson read a paper on "Nitriding."

Marmon Advances Three

Advancement of **Fred Lycett** to the position of district representative and the appointment of **J. W. Roop** and **M. N. Criswell** as wholesale representatives has been announced by T. E. Jarrard, general sales director of the Marmon Motor Car Co.

Dietrich Appoints Ledyard

M. K. Ledyard has been added to the sales organization of Dietrich, Inc., as sales representative. Mr. Ledyard was formerly connected with the Cadillac Motor Car Company in sales and service work.

Parr Returns to Australia

D. R. Parr, Reo representative in New Zealand, Tasmania and New South Wales, has returned to Australia after a visit at the factory in Lansing.

Claude H. Munn, who was recently appointed Durant representative for Mexico, Central America, Cuba and the West Indies, sailed Nov. 30 for Cuba, and an extended itinerary in the interest of the Durant corporation. Mr. Munn's service in tropical countries began in 1908 with the Civilian Service of Great Britain. This will be his 100th trip to the tropics.

Vincent E. Crawford, who has resigned as general manager of the Toledo Steel Products Co., has been appointed vice-president and general manager of the Thompson Products, Inc., plant at St. Catherine's, Ontario. Mr. Crawford entered the employ of the Thompson corporation in 1916, and was sent to the Toledo plant, then under Thompson control. He advanced to the position of assistant to the president.

Link-Belt Advances Hartley

The Link-Belt Co., Chicago, has announced the appointment of J. J. Hartley as chief engineer of the company's Pershing road plant in Chicago. Mr. Hartley has been connected with the company 19 years, and was formerly in charge of foundry equipment sales in the western division. **W. L. Hartley**, a brother of J. J. Hartley, has been appointed to occupy his brother's old position.

Fokker Returns to U. S.

Anthony H. G. Fokker, aircraft designer and consultant for the company which bears his name, returned recently from a six weeks' trip in Europe. Mr. Fokker spent most of his time while abroad visiting his Dutch connections and studying aeronautical developments in Europe.

Dodge to Tour Far East

V. A. Dodge, president of Dodge & Seymour, Ltd., New York, was a visitor late in November at the Toledo offices of the Champion Spark Plug Company, for which his company is distributor in Asiatic countries. His visit was in preparation for a tour of the Far East, on which he left from New York Dec. 7.

House Bill Would Give Aid to Airplane Makers

WASHINGTON, Dec. 9—A revolving loan fund of $100,000,000 to aid manufacturers of aircraft, would be provided by a bill which has been introduced in the House of Representatives by Rep. McLeod (Rep.), of Detroit. The fund would be administered by a board appointed by the Secretary of Commerce or through existing departmental agencies.

Another bill introduced by Mr. McLeod provides for the establishment of a Department of Aeronautics whose secretary would be of cabinet rank, and be empowered to assume all the functions now undertaken by the assistant secretary of commerce for aeronautics.

The appointment of a standing committee on aeronautics in the House of Representatives, consisting of 17 members, is contemplated in a third bill, also sponsored by Rep. McLeod.

Franklin Sales Gain

SYRACUSE, Dec. 9—Retail sales of Franklin automobiles for October and November exceed the volume of the same two months of last year by 20 per cent, H. H. Franklin, president of the Franklin Automobile Co., announced here today. Retail sales for each month taken separately also exceed the same corresponding months of 1928, according to the statement.

Crude Rubber Unsettled

NEW YORK, Dec. 9—Crude rubber continued unsettled last week with trading comparatively light, according to the F. R. Henderson Corp. Early estimates of November consumption are placed at 30,000 tons, and while it is possible that December consumption may increase slightly, some doubt is expressed as to a sufficient volume being used to advance the market to any great extent. The average weekly total for rubber invoiced to the United States during the last 13 weeks from the rubber growing countries was placed at 9904 tons.

French Journal Says Ford Plans Baby Car

PARIS, Dec. 7—According to La Journee Industrielle, a leading French business daily, the Ford Motor Co. is contemplating building a "Baby" automobile for the European market, in a factory now being built near Cologne. The car would be smaller than the present Ford model, and would be cheaper, it was said.

Rickenbacker Property Sold

DETROIT, Dec. 9—Sale of property of the Rickenbacker Motor Co. to the Sanders-Miller Corp., Detroit candy maker, at public auction for $300,000 was confirmed last week by Judge Charles C. Simons in United States District Court. The property consists of approximately six and one-half acres lying north of the Grand Trunk Railway.

To Hold Convention

DETROIT, Dec. 9—The International Transportation and Communication Union, representing over 3000 transportation and communication companies of the world, will hold its next convention in Poznan, Poland, July, 1930, it has been announced through the Polish consulate here.

Tire Prices Cut in Canada

TORONTO, Dec. 9—A three per cent cut in the prices of rubber tires and tubes was announced last week by Arthur B. Hannay, secretary of the Rubber Association of Canada. The cut is the result of reduced production costs, Mr. Hannay said.

Gordon Gordon Elected Taft-Pierce President

WOONSOCKET, R. I., Dec. 9—At a recent meeting of the board of directors of the Taft-Pierce Mfg. Co., Gordon Gordon of New York was elected president and treasurer to succeed the late Louis V. Hubbard. Mr. Gordon has been secretary of the company for the past 25 years.

Frederick S. Blackall, Jr., who continues as vice-president and general manager in active charge of the plant, was elected secretary to succeed Mr. Gordon. John W. Wheeler, Jr., of Bridgeport, Conn., was elected to the Board of Directors. The board now consists of Messrs. Gordon, Blackall, Wheeler, and R. W. Reid, of Providence, R. I.

N.S.U. Forms Subsidiary

BERLIN, Nov. 25 *(Special)* — The N. S. U. Automobil, A. G., of Heilbronn, controlled by F. I. A. T., has founded the Kraftag Gross-Berliner Kraftdroschken, A.G., with a capital of 2,500,000 marks. The new subsidiary is intended to operate 1200 N. S. U. taxicabs in Berlin, and will eventually, it is claimed, own and operate about 15 per cent of all the taxicabs in Berlin.

Asbestos Group Elects

NEW YORK, Dec. 12—H. W. Kelsey, Russell Mfg. Co., was elected president of the Asbestos Brake Lining Association at its annual meeting here today. William Brookes, Ferodo Asbestos Co., and M. S. Judd, Raybestos-Manhattan Corp., were named first and second vice-presidents, respectively. W. J. Parker is commissioner of the association, with headquarters at 11 East Forty-fourth St.

R. S. Rockwood, United States Bureau of Standards, spoke on standardization of linings, and Ray W. Sherman discussed merchandising.

Calendar of Coming Events

SHOWS

New York National.....Jan. 4-11
East Orange, N. J., Automobile ...Jan. 8-11
Newark (N. J.) Automobile Show.Jan. 11-18
Philadelphia, Automobile .....Jan. 11-18
Buffalo, Automobile .....Jan. 11-18
Milwaukee Automobile Show ....Jan. 11-18
Toronto, Automobile .....Jan. 11-18
Cincinnati, Automobile .....Jan. 12-18
Boston, Automobile .....Jan. 18-25
Detroit, Automobile .....Jan. 18-25
Baltimore, Automobile .....Jan. 18-25
Harrisburg, Automobile .....Jan. 18-25
Louisville, Automobile .....Jan. 18-25
Hartford, Automobile .....Jan. 18-25
Pittsburgh, Pa., Automobile .....Jan. 18-25
Brooklyn, Automobile .....Jan. 18-25
Montreal, Automobile .....Jan. 18-25
Louisville, Automobile .....Jan. 18-25
Los Angeles, Automobile .....Jan. 18-26
Rochester, Automobile .....Jan. 20-25
Chicago National, Coliseum..Jan. 25-Feb. 1
Cleveland Automobile Show..Jan. 25-Feb. 1
Copenhagen Trucks, etc. ....Jan. 25-Feb. 2
Columbus, Automobile .....Jan. 26-Feb. 1
Portland, Me., Automobile...Jan. 27-Feb. 1
Wilkes-Barre, Automobile ...Jan. 27-Feb. 1
San Francisco, Cal., Automobile...Feb. 1-8
Minneapolis, Automobile .....Feb. 1-8
Toledo, Ohio, Automobile .....Feb. 3-8
Wichita, Automobile .....Feb. 3-8
Cumberland, Automobile .....Feb. 3-8
Syracuse, Automobile .....Feb. 3-8
Ottawa, Automobile .....Feb. 3-8
Peoria, Automobile .....Feb. 4-8
St. Louis, Automobile .....Feb. 4-9
Cincinnati, Aircraft .....Feb. 8-14
Albany, Automobile .....Feb. 8-15
Akron, Automobile .....Feb. 8-15
Kansas City, Automobile .....Feb. 8-15
New York, American Legion, Aviation .....Feb. 9-15
Denver, Automobile .....Feb. 10-15
Indianapolis, Automobile .....Feb. 10-15
Sheboygan, Automobile .....Feb. 10-16
Mankato, Automobile .....Feb. 12-15
Providence, Automobile .....Feb. 14-22
Canton, Automobile .....Feb. 15-23
Copenhagen, Automobile .....Feb. 21
Camden, N. J., Automobile..Feb. 24-Mar. 1
Des Moines, Automobile ....Feb. 24-Mar. 1
Seattle, Wash., Automobile..Feb. 25-Mar. 2
Detroit (All-American Aircraft)..April 5-13

CONVENTIONS

National Automobile Dealers Association, New York City .....Jan. 6
American Road Bldrs. Assn., Atlantic City .....Jan. 11-18
Equipment for Motor Trucks, Inc., Atlantic City (during road show) Jan. 15
American Institute Electrical Engineers, New York .....Jan. 27-31
National Automotive Dealers Association, Chicago .....Jan. 27-28
Ohio Assn. of Commercial Haulers, Cleveland .....Jan. 30-31
Southwest Road Show and School, Wichita .....Feb. 25-28
American Society Mechanical Engineers, Fiftieth Anniversary Celebration:
New York .....April 5
Hoboken, N. J. .....April 7
Washington, D. C. .....April 8-9

S. A. E.

Annual Meeting, Detroit.....Jan. 21-24

SALONS

Hotel Biltmore, Los Angeles.....Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1